AECL EACL

Report

AECL Annual Environmental Performance Report for 2007

Company Wide

CW-509241-REPT-004
Revision 0

2009 February

UNRESTRICTED

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février 2009

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AECL EACL

Report, General

AECL ANNUAL ENVIRONMENTAL PERFORMANCE REPORT FOR 2007

COMPANY WIDE

CW-509241-REPT-004

Revision 0

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Revision History Liste de révisions

UNRESTRICTED
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CW-511300-FM-168 Rev. 0

Ref. Procedure CW-511300-PRO-191

Document No. / Numéro de document	CW	509241	REPT	004
	Doc. Collection ID ID de la collection de doc.	SI Répertoire du sujet	Section	Serial No. N° de série

Document Details / Détails sur le document

Title Titre	Total no. of pages N^bre total de pages
AECL Annual Environmental Performance Report for 2007	72

For Release Information, refer to the Document Transmittal Sheet accompanying this document. / Pour des renseignements portant sur la diffusion, consultez la feuille de transmission de documents ci-jointe.

Revision History / Liste de révisions

Revision / Révision					
No./N°	Date (yyyy/mm/dd)	Details of Rev. / Détails de la rév.	Prepared by Rédigé par	Reviewed by Examiné par	Approved by Approuvé par
D1	2008 Oct	Issed for "Review and Comment"	M.K. Ingram	D. Allinson R. Janzen S. Cotnam C. Wheeldon K. Lambert J. Bond R. Hamon D. Unrau J. Luiz D. Raman B. Campbell G. Walker	
0	2009/02/05	Issued as "Approved for Use"	M.K. Ingram	C. Gallagher	G. Dolinar

EXECUTIVE SUMMARY

This report summarizes the environmental performance of Atomic Energy Canada Limited (AECL's) operations and activities at its Canadian sites during 2007. Operations during 2007 were in compliance with applicable environmental regulations. Audits and assessments conducted during the year confirmed that AECL's verification and compliance monitoring programs continue to be effective.

AECL continued to work towards the improvement of its environmental performance and management system in 2007, and to implement the Environmental Protection Program requirements at the facility and activity level, leading to the successful maintenance of ISO-14001 registration of the Chalk River Laboratories (CRL) Site and the maintenance of the Canadian Nuclear Safety Commission (CNSC) rating of B for the Environmental Protection Program.

AECL completed the assessment of the environmental aspects, and their significance related to operations and activities at the CRL, Sheridan Park (SP), and Whiteshell Laboratories (WL) sites. Based upon these assessments, updated environmental objectives and targets have been developed and will be incorporated into AECL's Environmental Plan for 2008-2009 and CRL and WL Environmental Protection Program Indexes (EnvPPI).

The Environmental and Effluent Verification (Compliance) Monitoring Programs at all AECL sites continued to be effective and demonstrated that all air and liquid emissions comply with legal limits.

Radioactive emissions from AECL sites and facilities were monitored and remained below applicable Derived Release Limits (DRLs) in 2007. The sum of the average airborne weekly releases of all radionuclides from all monitored sources at the CRL site was 13.0% of the DRL, a value slightly higher than the 5-year average of 12.4% of the DRL, and identical to emissions monitored in 2006. Emissions of Argon-41 from the Nuclear Reactor Universal (NRU)/ Dedicated Isotope Facility (DIF) stack continued to be the most significant radioactive release from the CRL site, averaging 10.4% of the DRL, comparable to the 2006 value of 10.6% of the DRL and the average for the previous five years of 10.1% of the DRL. The emissions of mixed fission product noble gases from the Mo-99 Production Facility (MPF) were increased slightly, averaging 2.5% of the DRL. All other airborne and liquid emissions from CRL and other AECL sites were much lower and very small fractions of the respective DRLs.

Airborne emissions of non-radioactive substances from AECL sites and facilities continued to be estimated. Airborne emissions of acid gases at CRL, mainly from combustion of oil for building heating, were elevated in 2007 due to an increased consumption of fuel onsite, resulting from colder than usual temperatures during the winter months. Largely because of building decommissioning, the WL value was below the previous 5-year average, despite colder than usual weather. These factors also affected greenhouse gas emissions for both sites. Emissions of greenhouse gases were comparable to the previous 5-year average for CRL.

The number of times parameter concentrations exceeded internally-set AECL non-radiological guidelines in 2007 (forty-six (46) exceedences at WL and twenty-nine (29) exceedences at CRL) was consistent with the previous five years results. Waste Treatment Centre (WTC) effluents from CRL periodically exceeded AECL internally-set daily guidelines for mercury in 2007.

however, the mercury loading from the WTC's LWE continued to decrease in 2007, as was the trend in the previous five years.

An Ecological Effects Review (EER), completed in 2004 (see Section 2.3.5.3), concluded that based on benchmark values, there were no observable effects on populations of the most sensitive species on site as a result of releases from the Chalk River site. The recommendations from that study for further monitoring and performance improvement in selected areas continue to be implemented.

Solid radioactive wastes generated at AECL sites, as well as wastes received from external sources, continued to be stored safely in waste management facilities at the sites in accordance with AECL site licences. The CRL site continued to generate and store the largest quantities of radioactive waste. The volume in 2007 was consistent with that generated in 2002 through 2006. Waste diversion programs associated with the operation of the Waste Management Areas (WMA) at CRL, designed to minimize the quantities of low-level solid waste, operated efficiently in 2007.

The total volume of high-level liquid waste generated at AECL and added to current interim tank storage inventories remained small in 2007. Treatment provision for all low-level liquid wastes prior to discharge has been achieved for CRL, but not for WL. Efficient operation of the CRL WTC, designed to treat Low Level Liquid Wastes (LLLW) prior to discharge to the Ottawa River, continued in 2007. At WL, monitoring programs are in place to ensure that these wastes are below radioactive release criteria prior to discharge. Inventories of medium, high-level, and organic liquid radioactive wastes continued to be safely stored.

Recycling programs for minimizing quantities of non-radioactive wastes requiring disposal, and programs for collection and disposal of hazardous non-radioactive wastes at approved off-site facilities, operated successfully during the year.

Sewage sludge as of 2007 continues to be dewatered and stored in above ground containers in Waste Management Area "C". A detailed design and operational plan has been approved for the development of the proposed dedicated landfill.

Inventories of Ozone-depleting substances (ODSs) and Polychlorinated biphenyl (PCB's) in waste storage and in use continued to be well managed, and reduced where possible through phase-out programs. While inventories have remained relatively constant over the past several years, work continued at all sites towards achieving the target of eliminating all ODSs at AECL by 2020.

Quantities of chlorine used for water treatment at CRL and WL in 2007 were relatively consistent with previous years, although the quantity of chlorine used in 2007 was lower than the previous three (3) years.

Energy consumption at AECL sites is consistent with previous years. The intensity value has decreased, partly as a result of continued efficient operation of the heating boilers in the CRL Power House, and other energy improvements implemented in recent years.

In 2007, there were forty-one (41) environmentally related incidents recorded for CRL, three (3) for WL and two (2) for SP. There were no environmental incidents at Gentilly-1 Waste Management Facility, the Nuclear Power Demonstration Waste Management Facility, the

Douglas Point Waste Management Facility, or the areas under surveillance of and monitored by the Low Level Radioactive Waste Management Office (LLRWMO).

All incidents at WL, SP and CRL that were reported as environmentally related were investigated, as required. They were mitigated when possible, and corrective actions implemented when needed, in order to prevent recurrence of similar incidents.

Planning for facility and site decommissioning and for remediation of contaminated areas on AECL sites progressed. Three existing radioactive groundwater plume-interception systems at CRL continued to operate effectively. Decommissioning Plans are in place for all facilities, including the CRL site, as required by the CNSC. AECL communicated regularly with the public regarding environmental issues related to operations and activities at its sites through a variety of methods, including meetings with local community officials, public meetings and displays, internet websites, and various media stories.

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1. INTRODUCTION

1.1 AECL Sites in Canada

AECL was established in 1952 as a Canadian Crown corporation, reporting to the Parliament of Canada through the Minister of Natural Resources. AECL develops, markets, and manages the construction of Canada Deuterium Uranium (CANDU®) power reactors, produces medical isotopes, performs associated research and development, carries out underlying reactor research, supplies CANDU and light water reactor (LWR) support services, and offers radioactive waste management products and services.

AECL owned or operated numerous sites throughout Canada in 2007, including office and engineering sites, research sites, sites of decommissioned nuclear facilities, and sites for interim storage of historic low level radioactive wastes.

AECL's head office site is located in the Sheridan Park Research Community in Mississauga, Ontario. The Sheridan Park (SP) site also includes engineering offices and facilities, and an engineering laboratory. The laboratory operates in accordance with prescribed substance, and radioisotope licences issued by the (CNSC).

The largest and most diverse AECL site is the Chalk River Laboratories (CRL) research site at Chalk River, Ontario, including associated engineering offices in Deep River, Ontario. Whiteshell Laboratories (WL) at Pinawa, Manitoba, is another AECL site, currently undergoing decommissioning. Both these sites contain numerous nuclear and non-nuclear research and support facilities, and are operated or decommissioned in accordance with licences issued by the CNSC.

The Underground Research Laboratory (URL), located near the Whiteshell Laboratories, has been used to conduct geotechnical research into the concept of waste disposal in deep geological formations, as part of the Nuclear Fuel Waste Management Program (NFWMP). No radioactive wastes have been stored in this facility; it is currently also undergoing shutdown and early phases of decommissioning. The site is leased from the Province of Manitoba and operates in accordance with the Manitoba Mines Act.

AECL maintains the sites of several shutdown nuclear facilities, including the former Nuclear Power Demonstration (NPD) site at Rolphton, Ontario, the Douglas Point (DP) site at Tiverton, Ontario, and the Gentilly-1 (G-1) site at Gentilly, Québec. These sites are maintained in a "shutdown with surveillance" state in accordance with waste management facility operating licences issued by the CNSC.

AECL uses the site of the decommissioned heavy-water plant at LaPrade, near Bécancour, Québec, for storage of some heavy water under a CNSC prescribed-substance licence.

The LLRWMO manages (routine monitoring and regular surveillance) four CNSC-licensed sites (two licenses) in Port Hope where historic low-level radioactive waste is consolidated or stored on a temporary basis:

- The Sewage Treatment Plant Temporary Storage Site;
- The Strachan Street Consolidation Site;

- The Pine Street Extension Consolidation Site: and
- The Pine Street Extension Temporary Storage Site.

The Pine Street Extension Temporary Storage Site (including a small licensed area of a Quonset storage building) is the only site still receiving materials when found. Also in Port Hope there are 15 un-remediated and unlicensed sites that the LLRWMO routinely monitors and keeps under regular surveillance.

The LLRWMO also has a license for Historic Waste Remediation Operations, which allows the office to take possession of LLRW accumulations at other locations across Canada. Two additional licenses permit the LLRWMO to operate a laboratory and X-Ray Fluorescence analytical equipment in Port Hope.

The LLRWMO also conducts routine monitoring and surveillance of several other unlicensed sites located across Canada.

It should be noted that the LLRWMO operates under an independent agreement between the AECL President & CEO and Natural Resource Canada (NRCan). The 1982 agreement established the LLRWMO as a distinct unit of AECL in order to manage low-level radioactive wastes on behalf of the federal government. The agreement allows LLRWMO to operate independently of AECL's other roles.

2. ENVIRONMENTAL MANAGEMENT SYSTEM

2.1 AECL's Environment Policy

The Environment Policy, issued under the authority of the AECL Board of Directors, states AECL's commitment to protecting the environment, and establishes the overall principles and goals for environmental responsibility and performance expected of the organization, its managers and employees.

The following statements are taken from AECL's Environment Policy:

- We practice responsible environmental management;
- We are committed to the principle of pollution prevention;
- We set environmental objectives and targets to support continual improvement of our environmental performance;
- We comply with environmental laws, requirements, and recognized standards and guidelines applicable to our activities;
- We review the impacts of our activities, facilities, projects, services and products on the environment;
- We meet all applicable environmental requirements of our customers;
- We will seek to develop and improve technologies to advance environmental protection and clean air solutions; and
- We promote public and employee awareness of this policy.

The AECL Environment Policy also commits AECL to the concept of sustainable development. To help meet this commitment, the sixteen "*Principles for Environmental Management*" contained in the International Chamber of Commerce's Business Charter for Sustainable Development were used as guidance in the development of the Environmental Protection Program (EnvP Program).

Additional requirements and expectations of the Board of Directors include the production of an annual environmental plan, incorporating environmental objectives, targets and performance indicators for achieving continual improvement in environmental performance at AECL sites in Canada, and regular reporting by AECL management to a Sub-Committee of the Board of Directors on the implementation of the environmental policy and progress against the annual environmental plan.

2.2 Environmental Management in AECL

Overall accountability for environmental protection within AECL lies with the AECL Board of Directors. During 2007, the Board continued to fulfil its responsibilities through a subcommittee receiving and reviewing AECL management's reports on implementation of the Policy, resolution of identified issues, and progress against environmental plans during 2007.

The AECL Safety Review Committee (SRC), an internal committee independent of line management, reviews and approves, on behalf of the AECL President and Chief Executive

Officer, the acceptability of proposed and existing facilities and activities at AECL's Canadian sites with respect to protection of the environment, health and safety.

The Chief Environmental Officer and Senior Environmental Committee continue their mandate to ensure implementation of AECL's Environment Policy, ensure coordination of AECL's response to regulatory requirements on environmental performance, and to ensure fulfilment and continual review of AECL's environmental responsibilities. The Chief Environmental Officer is a member of the Senior Environmental Committee.

2.3 Environmental Management at AECL's Sites

2.3.1 Program Responsibility

Functional responsibility for development and maintenance of the environmental management system, processes and procedures that implement the AECL Environment Policy within AECL's Canadian sites lies with the AECL Environmental Protection Program, one of several company wide programs as defined by the AECL Management Manual.

Executive Authority responsibility for the Environmental Protection Program lies with the Senior Vice-President, AECL Nuclear Laboratories Business Unit (NLBU). Functional responsibility for developing, maintaining and implementing the Environmental Protection Program, as Program Authority, is with the Director, Environmental Division, within the unit of NLBU. The Environmental Panel consists of the General Managers and Senior Vice-President of the NLBU, the Program Authority and Program Manager. The Environmental Panel has general responsibility for recommending environmental protection policies and priorities, and reviewing environmental performance within AECL sites, and setting strategic objectives and targets. The Panel approves the Annual Environmental Plan that communicates the environmental objectives and targets and lists the actions planned to address these objectives and targets during the year.

2.3.2 AECL's Environmental Protection Program

The EnvP Program and Environmental Management System (EMS) requirements, responsibilities, processes and procedures are defined in the AECL EnvP Program Manual, RC-2000-021 (CW-509200 series). During 2007, efforts continued towards the implementation and improvement of the EMS, with the intent of achieving greater conformance with the ISO-14001:2004 standard at AECL sites in Canada, and maintaining registration to the standard for the CRL site. A Re-assessment Audit was conducted at CRL by Quality Management Institute (QMI), on 2007 June 11-15 to evaluate the suitability, adequacy and effectiveness of the organization's Management System in meeting the requirements of the ISO-14001: 2004 standard and the company's Management System Documentation, for the declared scope of registration. The results of the Re-assessment including the review of the performance of AECL's Management System over the past three (3) years and the Re-assessment Audit indicated that there is an effective and suitable inter-action between all elements of the management system, meeting all ISO 14001:2004 requirements.

Although no nonconformities were identified, eleven (11) Opportunities for Improvement and eight (8) Recommendations were raised as a result of this audit.

All Opportunities for Improvement will be addressed and verified by QMI auditors during the 2008 Surveillance Audit of the EMS (to the ISO-14001: 2004 standard), which is to be conducted at CRL 2008 May 06 – 08.

Starting in 2002-2003 and continuing through 2007-2008, the Environmental Panel undertook a strategic review of AECL's environmental performance index and re-defined AECL's strategic environmental objectives. These objectives are driven by AECL's Environmental Policy (revised in 2003 and re-affirmed in 2005), and address the potential for significant environmental aspects from AECL operations, AECL's business requirements and regulatory requirements. The Strategic Environmental Objectives are:

- Prevent Environmental Protection Degradation (includes Pollution Prevention[1]);
- Provide Responsible Environmental Management;
- Demonstrate Environmental (Regulatory) Compliance; and
- Provide Improvement of Environmental Protection Systems and Technology.

As part of the ISO-14001 initiative, the environmental actions associated with Strategic Objectives, have been formally documented in the Annual Environmental Plan 2006/2007 and 2007/2008. Table 2-1 summarizes AECL's strategic environmental objectives and shows the final status of key actions in the 2006/07 Environmental Plan captured under the respective objectives. In order to provide a better indication of performance, the progress towards completing these actions was tracked against the milestone completion (there are one or more milestones per action). The ninety-one (91) actions in the 2006/07 environmental plan corresponded with 269 milestones.

Table 2-1
AECL's Strategic Environmental Objectives and Key Actions in the 2006/07 Environmental Plan

Objectives	No. of Actions	No. of Milestones	No. of Change Requests	% Complete
Prevent environmental degradation	21	64	12	56%
Provide responsible environmental management	8	18	4	50%
Demonstrate environmental compliance	27	75	4	48%
Provide improvement on environmental protection systems and technology	35	112	36	72%
Total	**91**	**269**	**56**	**59%**

For the development of the 2007-2008 Environmental Plan, the Environmental Panel decided that increased focus was required on the high priority environmental issues. To achieve this, the actions were divided into two categories, high priority and lower priority. Senior Management

[1] **Pollution Prevention** - defined by Canadian Environmental Protection Act (CEPA) "as the use of processes, practices, materials, products, substances or energy that avoid or minimize the creation of pollutants and waste and reduce the overall risk to the environment or human health."

tracks progress in their Units' Balanced Scorecard and/or through progress updates at regularly scheduled Panel meetings. The focus of these updates will be on the high priority actions. Table 2-2 shows the number of actions and milestones associated with each strategic objective and the total percentage of milestones completed by 2007 December.

Table 2-2
AECL's Strategic Environmental Objectives and Key Actions in the 2007/08 Environmental Plan

Objectives	No. of Priority 1 Actions	No. of Priority 1 Milestones	% Priority 1 Milestones Complete as of 2007 Dec	No. of Lower Priority Actions	No. of Lower Priority Milestones	% Lower Priority Milestones Complete as of 2007 Dec
Prevent environmental degradation	5	18	71%	12	29	66%
Provide responsible environmental management	3	10	60%	11	32	59%
Demonstrate environmental compliance	10	22	95%	8	24	29%
Provide improvement on environmental protection systems and technology	13	41	46%	17	49	62%
Total	**31**	**91**	**65%**	**48**	**134**	**56%**

The EnvP Program Index defines a set of performance measures closely aligned with the strategic environmental objectives and the environmental aspects. For 2007-2008, the EnvP Program Index was simplified to provide better focus on those measures that represent the true environmental performance. In the previous index, the 2015 benchmark was used to represent the long-term strategic target. The yearly targets were compared against these 2015 benchmarks with the objective of eventually reaching 100% of the target. The new index still uses the concept of the strategic target, which is considered a stretch target to demonstrate continual improvement and benchmarking against "best in class" peers. An achievement of a lower value than the strategic target may still be an acceptable improvement depending on business circumstances.

The revised EnvP Program Index (EnvP PI) still contains four sub-indices, however, the measures in each were redefined to provide a more accurate representation of the performance in each area. The sub-index, Environmental Protection Index (EnvPI) is a measure of AECL performance against the goal to prevent environmental protection degradation (including pollution prevention). The EnvP Management Index (EnvPMI) is a measure of performance against the goal to provide a responsible environmental management system. The EnvP Compliance Index (EnvPCI) is a measure of the effectiveness related to compliance with legislation and regulatory requirements. The EnvP Systems and Technology Index (EnvPSTI) is a measure related to fitness for purpose of the systems and technology with respect to the provision of environmental protection and the reduction of risk. Each of these sub-indices is

aligned with a strategic environmental objective. The measures in the revised EnvP Program Index were chosen such that they are applicable to both WL and CRL.

The EnvP Program Index measures and targets to the end of December 2007 for CRL and WL, as approved by the Environmental Panel, are shown in Appendix A.

2.3.3 2007 Environmental Protection Program Initiatives

Various environmental improvement initiatives were completed in 2007, which support AECL's commitment to continual improvement in environmental performance:

- Successful re-registration of the CRL site to the "ISO-14001:2004" standard for Environmental Management Systems (EMS);
- Completion of eight site licence conditions related to the Environmental Protection Program on schedule. The remaining licence condition is on target for completion on schedule in 2008.

2.3.4 Environmental Aspects Assessments and Operational Control Reports

2.3.4.1 General

During 2007, as part of the continuing implementation and improvement of the EMS, and maintenance of ISO-14001:2004 registration for the CRL site, AECL continued to monitor all activities, products and services that interacted with the environment (Environmental Aspect - EA). The significance of each identified Environmental Aspect is evaluated, considering both environmental and business concerns. A Significant Environmental Aspect (SEA) is one that AECL considers important enough to ensure that it is being managed adequately to prevent potential environmental impacts, ensuring legal compliance requirements that AECL is subject to, and/or conform to other requirements that AECL voluntarily accepts. An Operational Control (OC) is any form of control that manages the environmental impact of an environmental aspect (for example, procedures, safety systems, maintenance, monitoring). Operational Controls are required for any identified SEA. However, controls should also be in place to manage any environmental risks that apply to a given facility or activity group.

AECL completed the initial identification and significance evaluation of environmental aspects associated with all operations and activities of facilities and activity groups at the CRL site in 2003. However, taking into consideration the requirement for annual review of the Environmental Aspect Assessments (EAAs), the over-all status of Environmental Aspect Assessment by the end of 2007 was approximately 86% up-to-date and on-track and improvements are on-going.

In 2007, operational control information for SEAs was improved through the further implementation and review of controls within the EMS Database. By collecting all operational control data within the same database for EAAs, there has been a continued improvement in the consistency of the control reports among facilities/groups. Further to this, like the EAA reports, the Operational Control (OC) Reports will also be subject to annual review by the owning facility/activity group management, starting FY 2008/2009.

2.3.4.2 Changes at AECL

There have been a number of changes to Environmental Aspect Assessments (EAAs) at CRL. In 2007 there were sixty-two (62) Groups with EAAs defined at CRL. The Number of Groups with Significant Environmental Aspects (SEAs) has increased from 34 to 39 Groups. Even though there are more groups with SEAs, the total number of SEAs has decreased by approximately 24%, from 308 to 236 SEA's in total and continues to decline. The primary reason for this decline is due to the introduction of a new category of aspects that allow a group to combine a number of similar aspects into one "indirect aspect". This in turn, provides focus on the SEA so that a facility/group can ensure that appropriate controls are in place for those areas where there is a greater environmental risk.

Operational Control Reports for Nuclear Facilities (NFs) SEAs were all reviewed for consistency in 2007. Reviews for other facilities/groups with SEAs are in progress and improvements are on-going with changes to SEAs.

The Environmental Aspect Assessment reports for WL were initially completed in 2005 December. All WL Environmental Aspects were re-evaluated and revised where necessary during February of 2007. In general, required changes were minor. Twenty-six SEAs were confirmed to be relevant.

All Operational Controls associated with the WL SEAs were re-examined and updated in the first three months of 2007. The completeness of information was increased, and some minor errors were corrected.

There were no changes identified to Sheridan Park EAAs during 2007. However, these assessments will require closer review in 2008 and require inclusion in the EMS database. To date, there are two (2) Facility and Activity groups with a total of four (4) SEAs.

Operational Controls for Sheridan Park SEAs are in place, but require closer review and formal approval in 2008/2009 fiscal year. The assessment of environmental aspects for SP was completed in 2007.

The EAAs for Douglas Point (DP) and Gentilly 1 (G1) are approved and complete. A draft EAA was completed for Nuclear Power Demonstration (NPD). During the review of environmental risks associated with NPD, no SEAs were assigned. The EAA for Glace Bay requires further review and an EAA needs to be established for the Laprade site. Operational controls for Off-Site Decommissioning SEAs are in place, but also require closer review and formal approval in 2008/2009 fiscal year.

2.3.5 Environmental Performance & Compliance Assessments and Reviews

2.3.5.1 Audits

In 2007 the following audits and Assessments were conducted:

- AECL CRL Internal EMS Audit conducted by the Independent Assessment Branch of Nuclear Oversight 2007 January 20 – February 02. Four (4) Audit Non-conformance Reports (ANRs) were issued and three (3) OFIs were raised;

- AECL CRL ISO-14001:2004 Re-assessment Audit conducted by Quality Management Institute(QMI), 2007 June 11 – June 15. No ANRs were issued, eleven (11) OFIs and eight (8) recommendations were raised;
- A CNSC Type II Compliance Inspection Report was conducted for the Dedicated Isotope Facilities Implementation of Environmental Protection Program on 2007 July 23-25. DIF Environmental Monitoring Program was found to be appropriate, generally meeting regulatory requirements and CNSC staff expectations and was given a CNSC B Rating. There were four (4) Action Notices and two (2) Recommendations assigned as a result of the inspection. No significance issues of non-compliance were identified during the inspection; and
- LLRWMO: Two audits were conducted on the LLRWMO Program in 2007 with respect to Environmental Protection:
  1. Internal Audit of the Quality, Environment, Health & Safety management program conducted by Corporate QA in 2007 January.
  2. Internal Audit of the Quality, Environment, Health & Safety management program conducted in 2007 June.

No audit actions were assigned as a result of these two audits. An Opportunity for Improvement (OFI) suggested included a calibration "Overview" document be prepared as well as introducing a calibration software management program for more efficient tracking.

These audits and assessments conducted in 2007 confirmed that AECL is maintaining its environmental performance in compliance with the ISO 14001:2004 standard, S296, meeting requirements under the CNSC and applicable legal and other requirements.

Progress made on actions resulting from audits and assessments conducted in previous years shows improvements in the process of assessing environmental impacts as a result of AECL's activities, development of environmental objectives & targets, improving environmental action plans, corrective actions and internal & external communication on environmental performance. AECL continues to move in the right direction to ensure that all AECL sites are headed for the successful implementation of a revised EMS.

2.3.5.2 Environmental Assessments

Environmental Assessments (EAs) pursuant to the Canadian Environmental Assessment Act may be required for proposed projects at AECL sites. The requirement to conduct an EA for a proposed project can be triggered by CNSC regulatory approvals, funding provided by other federal departments (e.g., NRCan), and AECL's role as a Federal Authority under the Canadian Environmental Assessment Act.

For nuclear infrastructure projects requiring CNSC regulatory approvals, the CNSC is the Responsible Authority, and as such is responsible for the conduct of the EA. For these EAs, the CNSC typically delegates the preparation of the technical studies to AECL.

NRCan through provision of funding of the Nuclear Legacy Liabilities Program is a Responsible Authority for projects within the funding envelope. NRCan shares responsibility for the conduct

of these EAs with the CNSC or AECL depending on the regulatory approvals required for the project to proceed.

For projects that do not require CNSC regulatory approval and are not funded through the Nuclear Legacy Liabilities Program, AECL is typically the sole Responsible Authority for the Environmental Assessment.

Generally if an EA has more than one Responsible Authority, one of the Responsible Authorities assumes the role of the Federal Environmental Assessment Coordinator (FEAC) and is responsible for coordinating the EA, and facilitating communication among Federal Authorities, and with provinces, jurisdictions and other interested parties.

Nineteen EAs were in various stages of completion in 2007. The projects fall into the following categories:

- Chalk River Laboratories research and operations infrastructure renewal (ten (10) projects);
- Sheridan Park Infrastructure (one (1) project)[2]; and
- Chalk River Laboratories and Whiteshell Laboratories Decommissioning and Site Restoration (eight (8) projects).

Table 2-3 lists the seven (7) EAs completed in 2007, and Table 2-4 lists the twelve (12) EAs ongoing in 2007.

2 The proposal, by the Regional Municipality of Peel, is an expansion of the Peel Region Water Supply. The AECL led Environmental Assessment was triggered through provision of land by AECL to enable the proposal to proceed.

Table 2-3
Environmental Assessments at AECL Sites: Completed in 2007

Project	Location	EA Type	Responsible Authorities	Canadian Environmental Assessment Registry #
Operation of CRL Waste Analysis Facility	Chalk River Laboratories	Screening	NRCAN	07-01-27355
Installation of CRL Property Boundary Fences	Chalk River Laboratories	Screening	AECL	07-01-24526
Construction of Two Parking Lots on AECL's Chalk River Laboratories Site	Chalk River Laboratories	Screening	AECL	07-01-32601
Construction of the New Entrance Building at Chalk River Laboratories	Chalk River Laboratories	Screening	AECL	06-01-22306
Decommissioning of a Pool Test Reactor at the Chalk River Laboratories	Chalk River Laboratories	Screening	CNSC, NRCan	04-01-6315
Decommissioning of Building 204A and 204B Fuel Storage Bays at Chalk River Laboratories	Chalk River Laboratories	Screening	CNSC	*FEAI Reference #: 16692
Construction of Peel Region Water main on land owned by Atomic Energy of Canada Ltd.	Sheridan Park, Mississauga, Ontario	Screening	AECL	07-01-34396

Notes: *Federal Environmental Assessment Index – For projects initiated prior to 2003 October

Table 2-4
Environmental Assessments at AECL Sites: Ongoing in 2007

Project	Location	EA Type	Responsible Authority	Canadian Environmental Assessment Registry #
Underground Research Laboratory (URL) Closure Project	Pinawa, Manitoba	Screening	NRCAN	07-01-35641
Proposed construction and operation of a new dry storage system for used fuel and non-fuel waste	Chalk River Laboratories, Ontario	Screening	CNSC	07-01-31052
Proposed construction and operation of a bulk materials landfill	Chalk River Laboratories, Ontario	Screening	CNSC	07-01-29999
Decommissioning of the NRX Ancillary Buildings	Chalk River Laboratories, Ontario	Screening	CNSC	07-01-27095
Bldg 137 Laboratory Project	Chalk River Laboratories, Ontario	Screening	AECL	07-01-35116
Chalk River Laboratory Power House Upgrade and Energy Efficiency Improvements	Chalk River Laboratories, Ontario	Screening	AECL	07-01-26934
Clean-up of two legacy landfill areas at the CRL site	Chalk River Laboratories, Ontario	Screening	AECL, NRCan	06-01-22196
Fuel Package and Storage Facility	Chalk River Laboratories, Ontario	Screening	CNSC, NRCan	05-01-9148
Decommissioning of a Plutonium Recovery Laboratory at Chalk River Laboratories	Chalk River Laboratories, Ontario	Screening	CNSC, NRCan	04-01-6503
Decommissioning of a Plutonium Tower at Chalk River Laboratories	Chalk River Laboratories, Ontario	Screening	CNSC, NRCan	04-01-6513
Decommissioning of a Waste Water Evaporator Facility at Chalk River Laboratories	Chalk River Laboratories, Ontario	Screening	CNSC , NRCan	04-01-6517
Decommissioning of the Heavy Water Upgrading Plant (HWUP) at Chalk River Laboratories	Chalk River Laboratories, Ontario	Screening	CNSC	*FEAI Reference #: 31931

Notes: *Federal Environmental Assessment Index – For projects initiated prior to 2003 October

2.3.5.3 Ecological Effects Review – Follow-Up

The final report detailing an Ecological Effects Review (EER) of the CRL site, which quantified the potential ecological effects of all present and past CRL activities and operations, was completed in 2004 and issued in 2005 January. The EER was conducted based upon available ecological risk assessment guidance from the Canadian Council of Ministers of the Environment (CCME 1996) and the U.S. Environmental Protection Agency (EPA 1998).

The EER report outlined a total of ten (10) recommendations, all of which were included in the 2006-2007 and 2007–2008 Environmental Plans.

The implementation of the recommendations complements the current CRL monitoring programs and will serve to guide, as appropriate, a review of the environmental protection program.

3. ENVIRONMENTAL PERFORMANCE

As described in Section 2, the performance of the EnvP Program is evaluated and measured against key targets. The environmental targets define in greater detail the expected levels of environmental performance that represent the potential for significant progress towards or achievement of, our environmental objectives outline in Section 2.3.2. Targets are quantifiable, where practical and are frequently intermediate to long term. The targets for 2007 at AECL sites were specified in the Environmental (performance) Sub-Index (EnvPI). Wherever possible and where applicable, the performance against these targets for the 2007 calendar year has been included in this report, further details are provided in Appendix A.

3.1 Emissions to the Environment

AECL's Environment Policy states that the Company will set objectives and targets to support continual improvement of our environmental performance. To this end, and as a condition of the site operating licenses, radiological emissions and hazardous substances to the environment are monitored and/or controlled as required.

3.1.1 Emissions of Radioactive Substances

3.1.1.1 General

In 2007 as in previous years, radioactive emissions from AECL sites and facilities have been regulated by the CNSC, through site-specific Derived Release Limits (DRLs) that are the legal upper bounds for releases to the environment. The DRLs are calculated using environmental pathway modelling, and are set such that a continuous release of any radionuclide at a rate less than the DRL would result in exposures below the public dose limit, 1 mSv in a year[3].

To ensure compliance with regulatory and AECL EnvP Program requirements, both airborne and liquid effluents from AECL sites and facilities that potentially contain radioactive contaminants are monitored. During 2007, there were no radioactive emissions from AECL sites or facilities in excess of regulatory limits.

3.1.1.2 Airborne Emissions

nt release to the environment.

Table 3-1
summarizes radioactive emissions in airborne effluents from the CRL, WL and NPD sites during 2007, along with values for the five previous years for comparison. The releases are given as the sum of emissions from all sources and all radionuclides for each site, and are expressed as a percentage of the DRLs in effect during 2007. Radioactive emissions from other AECL sites were negligible. The 2007 target for the CRL and WL sites described in the EnvP Program Index (EnvPPI), specifically the Environmental (Performance) Index (EnvPI) for radioactive emissions to air under normal operating conditions, was 12.0% DRL for CRL and 0.003% DRL for WL. Although the WL target was met for 2007 the CRL target was not. The

[3] The public dose limit of 1 mSv in a year came into effect in 2000 with the new Nuclear Safety and Control Act.

NRU reactor was operating at a higher average power in 2007 compared to 2005 and 2006, which would explain the small increase in Argon-41 releases. Additionally, in 2007, MPF emissions increased in mixed fission product noble gases as a result of operational changes, which do not allow for the complete decay of short-lived nuclides prior to cementation and subsequent release to the environment.

Table 3-1
Radioactive Airborne Emissions From AECL Sites 2002 to 2007

SITE	Total Airborne Emissions as % DRL						
	2002	2003	2004	2005	2006	5-yr average	2007
*CRL	14.9	10.3	12.8	11.2	13.0	12.4	13.0
**WL	0.0019	0.0015	0.0006	0.0006	0.0012	0.0012	0.0007
***NPD	0.0014	0.0029	0.0002	0.0001	0.0002	0.0010	0.0003

Notes: * The DRLs used for CRL are those in effect as of 2000 November 01.

** The DRLs used for WL are those in effect as of 2002 January 01. All data have been corrected for an error discovered earlier in the release factors. There is no inventory of I-131 in any of the facilities and it has not been detected in the last five years, so it has been removed from the table, and the results adjusted accordingly.

*** The DRLs in use at NPD from 1999 to 2003 were based on the old public dose limit of 5 mSv/a. The DRLs accepted by the CNSC in 2003 were implemented in 2004.

In 2007, the CRL site continued to account for the majority of airborne radioactive effluents from AECL. All emissions of radioactive material in CRL airborne effluents during 2007 were below regulatory limits, as expressed by the percentage of DRLs. The sum of the average airborne weekly releases in 2007, of all radionuclides from all monitored sources was 13.0% of the DRL. This was identical to the 2006 emissions, and above the average for the past five years of 12.4% of the DRL. Figure 3-1 illustrates the releases of radionuclides in airborne effluents from CRL for 2007 and the past five years.

Emissions of Argon-41[4] (Ar-41) from the National Research Universal/Dedicated Isotope Facility (NRU/DIF) stack continued to be the most significant radioactive releases from the CRL site, averaging 10.4% of the DRL, compared to an average for the previous five years of 10.1% of the DRL.

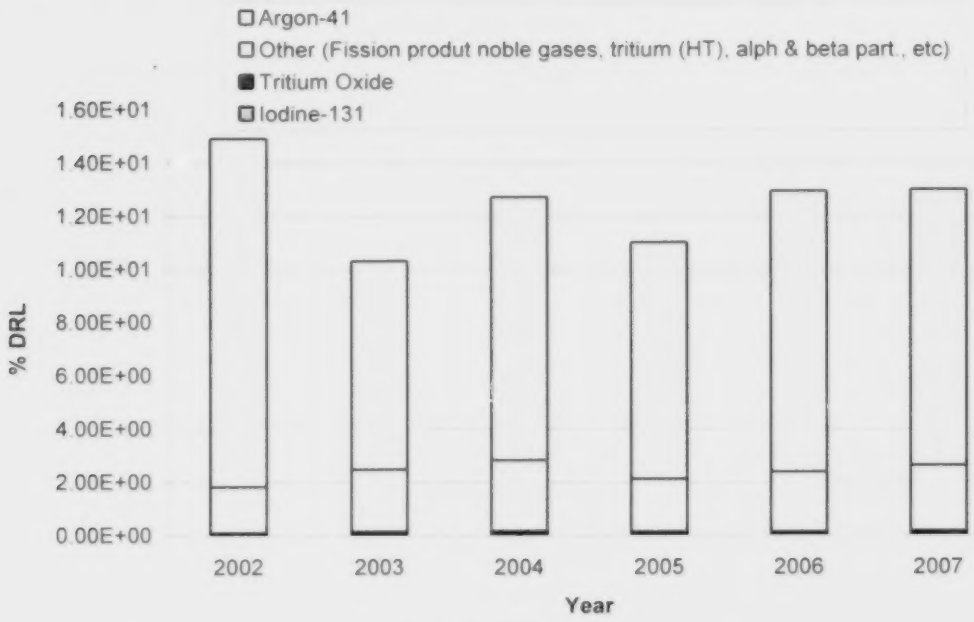
Argon-41 is produced by irradiation of air within the reactor structure. Two of the options from the ALARA study of Argon-41 (NRU-508700-SAR-001 Rev 1) are under way and will ultimately reduce the volume of air that experience a flux of neutron. Carbon-14 (C-14) releases are also produced by neutron-irradiation of air in the reactor, so any Ar-41 reduction measures also apply directly to C-14 reduction.

[4] Argon-41 is a relatively short-lived (half life 1.8 h) noble gas produced by irradiation of natural argon in air within the NRU reactor structure, for example, in the graphite thermal column, experimental beam holes and J-rod annulus.

Refurbishing of the Remote Stack Emissions Monitor equipment to provide reliable, real-time monitoring of Ar-41 and other significant radionuclides is underway. Environmental actions have also been initiated to study options for reducing the tritium concentration in the heavy-water moderator.

In 2007 releases of mixed fission product noble gases from the molybdenum-99 medical isotope production process increased by a small amount, averaging 2.5% of the DRL. In 2006 the value was 2.3% of the DRL. Increased emissions from the Molybdenum-99 Production Facility (MPF) are attributed to a variety of factors, including quantity and timing of isotope requirements for certain periods. The requirement to solidify (cement) high-level radioactive wastes from the process, since the Fissile Solution Storage Tank, which normally receives these wastes was near its approved maximum capacity, continued throughout 2007.

The releases of other monitored nuclides or parameters remained comparable with the levels of the past five years.



NOTE: Gross Beta is assumed to consist entirely of Cs-137, Gross alpha is assumed to consist entirely of Am-241 as these are the species with the most restrictive DRLs.

Figure 3-1 Radionuclides in CRL Airborne Effluents (2002-2007)

The 2007 air emissions results from the CRL Radiological Effluent Monitoring Program continue to demonstrate that radiation exposures resulting from the CRL site operations continue to remain below the public dose limit specified in the Nuclear Safety and Control Act Regulations.

The Whiteshell Laboratories routine Effluent and Environmental Monitoring Programs were maintained in 2007. The results of the program for routine effluent radiological measurements are summarized in Whiteshell Laboratories-Annual Safety Review for 2007, and for environmental measurements in Radiological Environmental Monitoring in 2007 at Whiteshell Laboratories.

3.1.1.3 Liquid Emissions

Table 3-2 summarizes radioactive emissions in liquid effluents from the CRL, WL, NPD and DP sites during 2007, along with values for the five previous years for comparison. The releases are given as the sum of emissions from all sources and all radionuclides for each site, and are expressed as a percentage of the DRLs in effect during 2007. These releases are also illustrated in Figure 3-2. Radioactive emissions from other AECL sites in 2007 were negligible. The target for the CRL and WL sites described in the EnvPI, for the 'emissions to water' under normal operating conditions, was 0.08% of the DRL and 0.013% of the DRL, respectively. Neither the CRL or the WL targets were met in the 2007 calendar year.

Table 3-2
Radioactive Liquid Emissions From AECL Sites 2002 to 2007

SITE	Total Liquid Site Emissions as % DRL						
	2002	2003	2004	2005	2006	5-year average	2007
*CRL	0.21	0.19	0.26	0.26	0.21	0.23	0.09
**WL	0.012	0.013	0.016	0.014	0.010	0.013	0.015
***NPD	0.024	0.020	0.002	0.001	0.002	0.010	0.002
****DP	0.015	0.015	0.001	0.004	0.010	0.009	0.005

Notes:

* The DRLs used for CRL are those in effect as of 2000 November 01.

** The DRLs used for WL are those in effect as of 2002 January 01.

*** The DRLs in use for NPD from 1999-2003 were based on the old public dose limit of 5 mSv/a. New DRLs were approved by the CNSC in 2003 and implemented in 2004.

**** DRL values used for Douglas Point from 1999-2003 were based on the old public dose limit of 5mSv/a. New DRLs were approved and implemented in 2004 September.

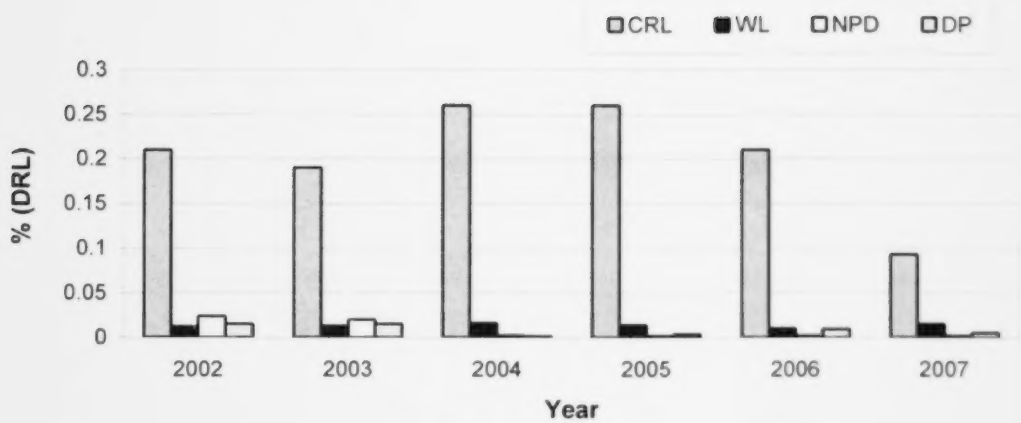


Figure 3-2 Radioactive Liquid Releases From AECL Sites (2002-2007)

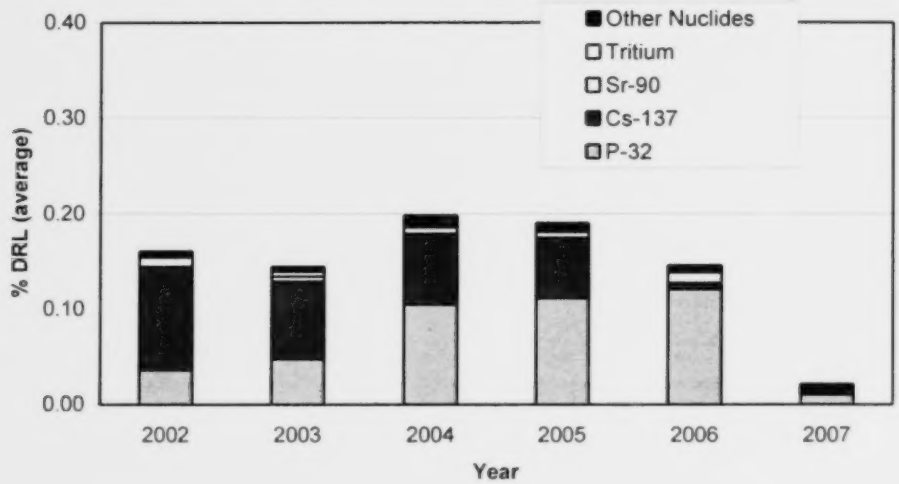
In 2007, the CRL site continued to account for the majority of liquid radioactive effluents from AECL sites. A more detailed breakdown of CRL liquid effluent emissions for the current and past five years is illustrated in Figure 3-3.

All radioactive liquid effluent emissions from CRL in 2007 were small fractions of the respective DRLs for each parameter monitored. The total release from all effluent streams averaged 0.09% of the DRL, indicating a decrease from 2006 value of 0.21% of the DRL and the average of the past five (5) years (0.23% of the DRL). The decrease in liquid effluent emissions can be directly attributed to the termination of the once-through cooling process of the NRU experimental loops in May of 2006. The U1 and U2 loops were placed in a cold solid circulation mode for the remainder of 2006 and all of 2007. NRU Operations completed the design reviews and began the installation and commissioning of Cold Pressure Tube Cooling (CPTC) system, a recirculating light-water system that provides pressure cooling. Once-through cooling of the in-reactor pressure tubes by process water is no longer permitted. In order to avoid radioactive releases into the process water outfall, pressure-tube cooling was provided by the loops pumps and heat-exchangers. The experimental fuel testing program remains suspended pending loops upgrades and the required upgrades cannot be started until CPTC frees up the loops.

In 2007, there were two dominant sources of radiological liquid releases from the CRL site, the Process Sewer and Discharges to Maskinonge Lake as a result of Lower Bass Lake Inlet Weir. The CRL Process Sewer that discharges decontaminated wastewater from the Waste Treatment Centre and some process cooling and sumpwaters to the Ottawa River was the major contributor. The releases averaged 0.03% of the DRL. Compared with the respective DRLs, the most significant nuclide in the Process Sewer releases in 2007 was Phosphorus-32, averaging 0.011% of the DRL. Phosphorus-32 and other short-lived activation products were detected during the period between January and May. They are attributed to once through cooling of de-fuelled NRU experimental loop test sections with Ottawa River water, resulting in activation of the

cooling water during passage through the in-reactor segment of the loop. Tritium releases from the Process Sewer averaged 0.00214% of the DRL, a decrease compared to 2006, but comparable to the previous 5-year average of 0.00288% of the DRL.

Release from CRL liquid effluent streams discharging directly to the Ottawa River, other than the Process Sewer, averaged 0.06% of the DRL, a value consistent with that in previous years.



*Error in 2006 Report, Strontium-90 emission corrected in this report for each year (2002-2006)

Figure 3-3 Summary of Radionuclides in CRL Liquid Effluents (2002-2007)

For WL, the sum of average monthly releases of all monitored parameters was 0.015% of the DRL in 2007. Cesium-137 (Cs-137) (0.011% DRL) was the most abundant isotope emitted from the outfall, while gross alpha (0.00076% DRL) was greatest from the sewage lagoon (see Figure 3-4).

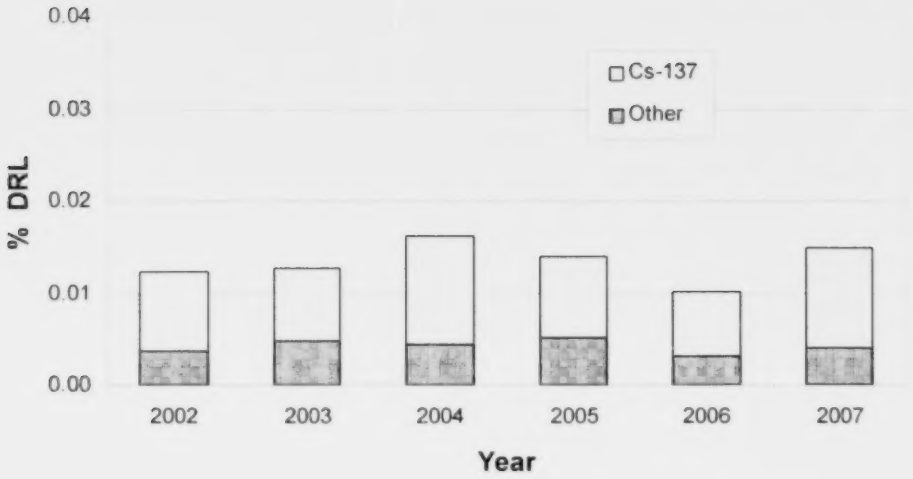


Figure 3-4 Summary of Radionuclides in WL Liquid Effluents (2002-2007 % DRL)

3.1.1.4 Monitoring of Radioactivity in the Environment

In addition to monitoring of effluents released from the sites, AECL continued to maintain extensive programs to monitor radioactivity in the environment at and around the major licensed sites, CRL and WL, to verify effluent monitoring results. Monitoring included, for example, measurement of ambient gamma radiation, as well as sampling and analysis of drinking water, meat, air, milk, fish, garden produce, and beach/river sediments. The results of the environmental monitoring continued to confirm that radiation doses resulting from AECL operations were below the regulatory dose limit for members of the public, 1 mSv per year, and below the typical background dose from natural radiation in Canada (see Table 3-3).

At CRL, the highest dose to the public (0.0726 mSv) continued to be due to external exposure to radioactive noble gases (mainly Argon-41) from the NRU reactor operations. Steps continue to be taken aimed at reducing Argon-41 production to the extent possible. The second highest potential dose to public is associated with the consumption of meat and of game animals that have had historical access to water and vegetation in swamps and streams adjacent to the CRL Waste Management Areas (WMAs) (0.012 mSv). In 2007, the calculated maximum dose from game animal meat ingestion showed a decrease from 2006, mainly because in 2006 there was comparatively higher Cesium-137 (Cs-137) and Strontium-90 (Sr-90) contamination detected in a single large game animal found within the CRL site. These contributions stem from historical factors rather than the current practices, i.e. past waste management practices at the WMAs. In addition, those areas of the swamps and streams that can give rise to concentrations of man-made radionuclides in game animals have now been fenced thus preventing future access by large game animals (e.g. deer and moose).

Measurements of radiation levels and radioactive contamination within and outside the WL site boundary were performed during 2007. These measurements verified that levels of radiation and

radioactive contamination due to operations at the site, as well as the resulting radiation doses to members of the public, were below regulatory limits[5] and guidelines.

Monitoring of potential liquid effluent exposure pathways has confirmed small but measurable contributions from WL operational and decommissioning activities of Cs-137 and Sr-90. These appear in WL downstream concentrations of radionuclides in Winnipeg River water and fish. This correlates with effluent monitoring results. Radioactive contaminants in Winnipeg River water remained very small fractions of allowable levels defined in the Canadian Drinking Water Standard.

Monitoring of potential atmospheric effluent exposure pathways did not indicate any measurable dose contributions from the site activities in excess of natural background levels. This is also consistent with effluent monitoring results, which indicated that airborne emissions were very small ($<1.5 \times 10^{-5}$ mSv/a).

The 2007 environmental monitoring results correlate with the operational and decommissioning activities that were conducted during the current year and previous years. These results and effluent monitoring results at the release points supported the dispersion pathway models on which the Derived Release Limits are based within the uncertainty of the results at these low levels.

The estimated dose to the most exposed members of the public due to radioactivity in WL effluents, based on the environmental monitoring results for 2007, was very small compared with the regulatory public dose limit (<0.1%), and with doses to the Canadian public from natural background radiation (<0.03%). The contributors to the total dose are near the detection levels and therefore have a relatively high uncertainty, so caution must be used in any interpretations of the data. It does not appear that the decommissioning operations conducted in 2007 resulted in a statistical increase in the dose to members of the public.

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[5] The regulatory limit for non-occupational effective radiation dose to members of the public from operations and products involving ionizing radiation (excluding medical procedures) is 1 mSv per year.

Table 3-3
Total Estimated Doses to Critical Groups at CRL and WL Based on Environmental Monitoring – 2002 – 2007

Site	CRL		*WL	
Effluent Pathways	Airborne	Liquid	Airborne	Liquid
Critical Group	Infant living at Upriver Boundary	Adult living Downstream	Infant living at Boundary	Adult living Downstream
2007 Total Effective Dose (mSv/a):	0.0726	0.0137	0.000007	0.00084
– as % of annual public dose limit, 1 mSv	7.3	1.4	0.0007	0.084
– as % of typical average background radiation dose in Canada	2.2	0.4	0.00028	0.021
2006 Total Effective Dose (mSv/a)	0.077	0.026	0.00001	0.0004
2005 Total Effective Dose (mSv/a)	0.086	0.018	0.000008	0.0016
2004 Total Effective Dose (mSv/a)	0.075	0.045	0.000007	0.00037
2003 Total Effective Dose (mSv/a)	0.098	0.021	0.000009	0.00078
2002 Total Effective Dose (mSv/a)	0.100	0.033	0.000008	0.00061

Notes: * DRLs for the WL site were revised in March 2001 and approved for use in 2002 January. The revised document (RC-2303) states that the critical group for airborne DRLs consists of adults and infants at the boundary and, as such, data in this table have been revised to reflect the new values. (The DRLs used for CRL are those in effect as of 2000 November 01).

3.1.2 Emissions of Non-Radioactive Substances

3.1.2.1 Airborne Emissions

3.1.2.1.1 Acid Gas Emissions

The main non-radioactive airborne emissions from stationary sources at AECL sites are combustion products that result from the burning of fuel oil to produce steam and hot water for heating and process uses at CRL and WL. Additionally, some emissions of nitrogen oxides (NO_x) are emitted from the use of propane for heating in some locations at both sites. Total estimated emissions of NO_x and sulphur oxides (SO_x) for CRL and WL are given in Table 3-4 and compared to previous years emissions. The estimated emissions for the past five years are also illustrated in Figure 3-5.

The NO_x emissions for CRL shown in Table 3-4 are based on emission factors determined through direct measurements of stack emissions following installation of new boilers in the CRL Power House. The NO_x emissions for WL and for previous years at CRL were estimated using the United States EPA [6] emission factors for the particular type of fuel and boiler design.

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[6] US Environmental Protection Agency, *Compilation of Air Pollutant Emission Factors, Vol I: Stationary Point and Area Sources*, AP-42, 5th Edition (1996).

The SO_x emission estimates in Table 3-4 for both CRL and WL are calculated using the United States EPA emission factors, based on the sulphur content of each fuel.

Commencing in 2002, under the National Pollutants Release Inventory (NPRI) program, Criteria Air Contaminants (CACs) arising from the burning of fuels are to be reported to Environment Canada, provided the emissions exceed specific threshold limits. CACs consist of Carbon Monoxide (CO), oxides of sulphur and nitrogen (SO_x and NO_x), Total Particulate Matter (TPM), Particulate Matter below 10 microns (PM_{10}), Particulate Matter below 2.5 microns ($PM_{2.5}$), and Volatile Organic Compounds (VOCs). The amounts are calculated from fuel consumption data using recommended emission factors. In 2007, CRL's SO_x, NO_x, TPM, PM_{10} and $PM_{2.5}$ emissions were above the threshold limits and therefore reported to the National Pollutant Release Inventory (NPRI) program. They were all below threshold for WL. Data for CAC emissions are included in Table 3-4.

Table 3-4
Acid Gas Emissions from CRL and WL Site Heating Boilers and Propane

Site	Emission	Total Annual Emissions (tonnes)						
		2002	2003	2004	2005	2006	5-year average	2007
CRL	NO_x	55.6	55.5	59.4	57.5	60.4	57.7	61.2
	*SO_x	250	246	260	214	247	243	262
	CO	6.15	6.33	6.61	6.35	6.63	6.41	6.79
	TPM	18.5	18.3	19.6	19.2	18.7	18.9	****39.0
	PM_{10}	16.0	15.8	16.9	16.4	16.1	16.2	****21.9
	$PM_{2.5}$	10.4	10.3	11.0	10.6	10.5	10.6	****11.5
	VOC	0.370	0.373	0.396	0.457	0.471	0.413	0.480
	***HDD	4601	4890	4864	4583	4239	4635	4617
WL	NO_x	10.6	10.4	10.6	9.9	9.2	10.1	9.7
	**SO_x	3.1	3.1	3.1	2.9	2.7	3.0	2.9
	CO	2.2	2.2	2.2	2.1	1.9	2.1	2.0
	TPM	0.88	0.87	0.88	0.83	0.77	0.85	0.81
	PM_{10}	0.44	0.43	0.44	0.41	0.38	0.42	0.41
	$PM_{2.5}$	0.11	0.11	0.11	0.10	0.10	0.11	0.10
	VOC	0.09	0.09	0.09	0.08	0.08	0.09	0.08
	***HDD	5750	5369	6215	5369	5011	5543	6032

Notes:
* SO_x estimates based on sulphur content specification of <2%. In 2002, 2003, 2004, 2005, 2006, and 2007 the actual content of sulphur in the fuel was measured to be 1.34%, 1.32%, 1.30%, 1.11%, 1.22%, and 1.27% respectively.

** Estimates of SO_x emissions are based on the specified maximum sulphur content in the #2 fuel of 0.05% by wt.

*** HDD – Heating Degree Days for normalization of data.

**** CRL Site TPM, PM_{10}, and $PM_{2.5}$ emissions increased significantly in 2007 due to the requirement of reporting to the NPRI, estimated road dust emissions from the CRL site. The CRL site was the only AECL site, which met the NPRI threshold for reporting this measure.

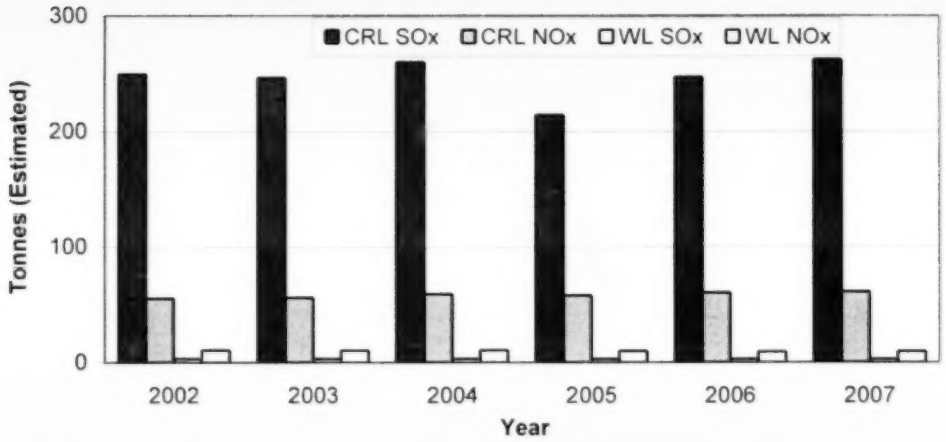

Figure 3-5 Acid Gas Emissions for CRL and WL (2002 – 2007)

The targets for CRL and WL sites specified in the 2007 EnvPI, for the combined emissions of SO_x and NO_x under normal operating conditions, were 320 tonnes and 11 tonnes, respectively. The combined emissions of NO_x and SO_x for CRL and WL sites were 323 tonnes and 13 tonnes, respectively, with both sites being slightly over the 2007 targets. 2007 had the highest consumption in volume of Number 6 fuel oil in the past five years. This increase was directly related to the Heating Degree Days (HDD) in 2007. Because of this increased fuel consumption, 2007 also saw an overall increase of acid gas emissions.

3.1.2.1.2 Greenhouse Gas Emissions

Operation of the industrial heating boilers and use of propane for heating in some areas at CRL and WL also represents the major source of carbon dioxide (CO_2) emissions from AECL sites. Estimates of CO_2 emissions from these sources in 2007 and the five previous years are shown in Table 3-5, and are illustrated in Figure 3-6. For both sites, emissions were estimated using the US-EPA emission factors for NO_x and SO_x (see previous section). The CO_2 emissions were estimated using the US-EPA AP-42 emission factor of 70.4 kg/GJ for #6 fuel oil, 35.2 kg/GJ for propane, and 69.1 kg/GJ for #2 fuel oil. Emission levels for the CRL and WL sites were 33,733 tonnes and 9,023 tonnes, respectively. CRL site emissions were slightly above both the 2006 emissions and the 5-year average, directly related to the Heating Degree Days in 2007. Those for WL were above 2006 levels because of colder than usual weather, but still 4.3% below the five-year average. This change is attributed mostly to decommissioning of some site buildings, resulting in continuing decreases relative to heating degree days.

Table 3-5
Estimated Carbon Dioxide *Emissions from CRL and WL Site Heating Boilers and Propane Use

Site	Emission	Total Annual Emissions (tonnes)						
		2002	2003	2004	2005	2006	5-year average	2007
CRL	CO_2	30300	31700	32800	31500	32928	31846	33733
WL	CO_2	9850	9680	9840	9210	8539	9424	9023

Note: Emissions were estimated using the United States-EPA AP-42 emission factor of 70.4 kg/GJ for #6 fuel oil, 35.2 kg/GJ for propane, and 69.1 kg/GJ for #2 fuel oil.

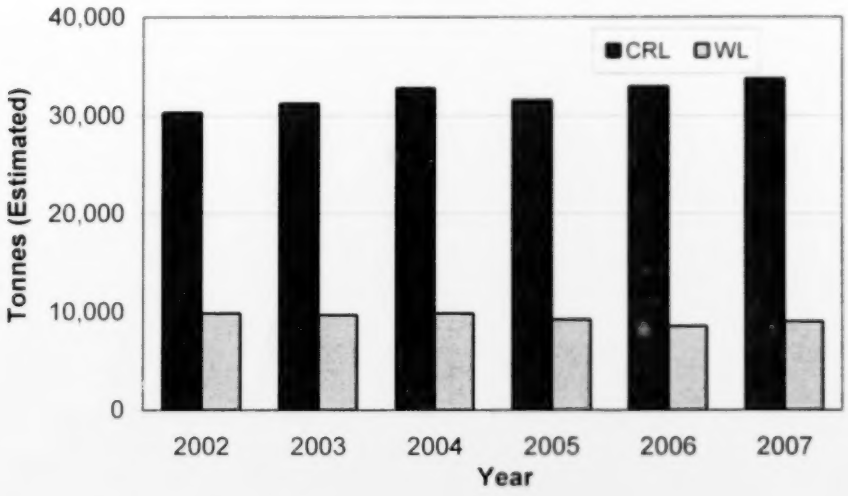

Figure 3-6 Carbon Dioxide Emissions (2002 – 2007)

WL airborne emissions were not large. Production of key airborne contaminants through combustion of fuels continued to drop relative to heating degree days.

Emissions of halocarbons due to losses from various systems at AECL sites as well as the relative Global Warming Potentials and Ozone Depleting Potentials of these substances and the calculated CO_2 equivalents from the previous five years, as well as the current year, are included in Table 3-6.

Halons are still being used in some fire suppression systems, however plans are in progress to replace all such systems at CRL by 2008, and at WL by 2009. The Fluoroform (HFC (R-134a)) emissions at CRL in 2007 were relatively small compared to previous releases of this type. The

release was a result of one accidental leak, which was detected and repaired. Previous releases were heavily influenced by the refilling requirements of the thermal hydraulics loop, which has an inventory that can vary between 4500 and 6200 kg, depending on the piping configuration. The loop was not refilled in 2007. It should be noted that the halocarbon R-134a has no Ozone Depleting Potential and a relatively low Global Warming Potential when compared to other halocarbons used on site.

Table 3-6
Emissions of Halocarbons from AECL Sites (kg)

Type	*Global Warming Potential	**Ozone Depleting Potential	CRL						Other Sites
			2002	2003	2004	2005	2006	2007	2007
Halons (1301)	6900	10	0	0	0	0	12.3	0	0
CFC (R-11, R-12)	10600	1	0	0	18.14 (R-12)	0 (R-12)	0	0	0.79
HCFC (R-22)	1700	0.055	115.5	114.3	258.31	162.40	103.87	129.27	19.6
HFC (R-134a)	1300	0	1500	200	1652.6	0	814.8	60	0
CO_2 equivalent (tonnes)			2146	454	2742	276	1321	298	20

Notes: * Global warming potential (GWP) per unit mass relative to CO_2 = 1

** Ozone depleting potential (ODP) per unit mass relative to CFC-11 = 1

3.1.2.2 Liquid Effluents

Liquid effluents from AECL sites are monitored for non-radioactive contaminants in order to measure conformance with AECL's internal guidelines for chemical substances in liquid effluents, or with directly applicable limits or guidelines established by regulatory authorities. The AECL guidelines are comparable with Environment Canada effluent guidelines for federal facilities and various other federal and provincial effluent guidelines.

The non-radiological effluent-monitoring program originally set up voluntarily by AECL, based on the Ontario Ministry of the Environment's Municipal Industrial Strategy for Abatement (MISA) program, became a CNSC regulatory requirement as of 2000. This program continues to supply valuable information on the potential non-radiological environmental impacts of CRL's operations on the Ottawa River and the local environment, as well as those of WL on the Winnipeg River. The two CRL process effluent streams (Waste Treatment Center and Building 205 Tanks), the Power House Drain and the Sanitary Sewer, are the main contributors to estimated loadings. The total number of exceedences at CRL and WL, for all monitored criteria and streams, compared to the applicable annual target for the current year, is summarized in Table 3-7. The number of exceedences at CRL in 2007 was comparable to that of 2006. There was a temporary increase at WL, arising from chemical leaching during decontamination of articles removed during building decommissioning. These have been corrected for 2008 by procedural changes.

Table 3-7
Exceedences of Monthly Guidelines for non-Radiological Liquid Effluents

Site		Exceedences of Monthly Guidelines					
		2002	2003	2004	2005	2006	2007
CRL	Number	42	*29	*27	30	29	29
WL	Number	70	44	26	48	33	46

Notes: *Values for 2003 and 2004 for the CRL site revised.

CRL Site

In 2004 November, CNSC staff indicated that CRL's longstanding practise of placing sewage sludge directly into Waste Management Area "C" was no longer acceptable and should be halted immediately. CRL complied with the request and the sewage sludge continues to be dewatered and stored in above ground containers in Waste Management Area (WMA)-C. This temporary storage arrangement has been approved by the CNSC and will continue until a dedicated landfill structure becomes available. A detailed design and operation plan for the proposed landfill was completed in 2006. The design shows a double-lined landfill with an associated leachate collection system, meeting the most rigorous landfill design standards available at the CRL site.

Exceedances outlined in Table 3-7 are from 3 main liquid streams: the Waste Treatment Centre (WTC), Building 205 Tanks (B205) and the Sewage Treatment Plant (STP).

The Waste Treatment Centre is designed to collect and treat radioactive liquid waste. The WTC continues to have exceedences for pH, mercury and phenolics as it has had over the past five years.

There is a decreasing trend in the number of months when pH and phenolics met the AECL Guidelines compared to 2006. With respect to mercury, the WTC was as successful at meeting the AECL Guidelines for mercury as it was in 2006. In addition, mercury loading from the WTC also continued to decrease in 2007.

The WTC continues in its efforts to decrease the number of exceedances seen from the facility. It should be noted that the WTC does not discharge directly to the environment but instead discharges to the Process Sewer, which in turn, discharges to the Ottawa River. The Process Sewer continued to consistently meet the AECL Guidelines in 2007.

Building 205 contains tanks (B205 Tanks 46 E, F and G) for the collection, temporary storage and transfer of low-level liquid wastes generated in a portion of the CRL site. The parameters for these tanks, which did not consistently meet AECL Guidelines in 2007 were zinc, iron, phenolics and Total Suspended Solids (TSS). There was one month when zinc exceeded the AECL Guidelines, three months when iron exceeded, one month when phenolics exceeded and one month when TSS exceeded. This was both an increased number of exceedences compared to previous years and exceedences of some parameters, which we have not seen exceed at this monitoring point in the past five years. Investigations into these exceedences are ongoing. It

should be noted however, that the Process Sewer, into which B205 discharges, in turn, discharges directly to the Ottawa River and continues to consistently meet the AECL Guidelines for each of these parameters.

The Sanitary Sewer or Sewage Treatment Plant (STP) at CRL collects domestic wastewater from over eighty (80) buildings on site. It also receives small amounts of low-toxicity, soluble and biodegradable chemicals from a number of laboratories. The STP effluent is the stream with the most comprehensive monitoring schedule of all the streams monitored on site.

Emissions periodically exceed AECL internal guidelines for some parameters. In 2007, the Sanitary Sewer effluent had three (3) exceedences, a decrease from the eight (8) exceedences occurring in 2006.

These exceedances are likely associated with the introduction of the sewage sludge dewatering process. The STP has contracted the services of an external consultant in 2006 to assess the operations of the STP and make recommendations for interim process improvements to be put in place until the planned STP upgrades are completed. The interim improvements, which occurred during 2007, include: a major overhaul of the clarifier that included replacements of many components of the clarifier; and, starting to utilize a new type of polymer. As a result of this new polymer, expected decreases in TSS and phosphorous concentrations were observed following this installation.

The results of the overall program demonstrate that the controls for the release of potentially hazardous substances currently in place at CRL continue to provide reasonable protection to the environment.

3.1.2.2.2 WL and URL Sites

Measurements of non-radiological parameters in WL effluents were also conducted. The Lagoon and Outfall are the only significant liquid streams discharging to surface waters. Two site drainage Ditches, flowing west to north to reach the river contribute only during spring thaw and heavy rainfall events.

Loadings to the Winnipeg River were calculated for assessment, and trends were identified by comparison to the previous five years. Many results remained within the range of past years' performance. Five paramteres (phosphorus, TSS, chromium, lead, and oil & grease) were each below normal, while only Biological Oxygen Demand (BOD) and phenolics were above. Biological Oxygen Demand (BOD) in the fall discharge of the Lagoon was impacted by diversion of wastewater to the secondary cell during a spring investigation of the primary. Phenolics remain low (2.3 kg), and may simply reflect increased recovery of the analytical method. In total, the site load in 2007 (4724 kg) was by far the lowest ever achieved since before 1998 (6899 kg).

Monthly monitoring of Intake water, begun in 2007, demonstrated that the quality of water received varies throughout the year. Comparison of loads pumped in from the river to those discharged suggests that the site contributes no net contaminant for all but iron, phosphorus, copper and zinc, which are modest.

The results of the overall program demonstrate that the controls for the release of potentially hazardous substances currently in place at WL continue to provide reasonable protection to the environment.

At the nearby Underground Research Laboratory (URL), uranium concentrations in the holding-pond water remained below the discharge criterion (0.1 mg/L), and off-site surface waters did not have enhanced levels. Total dissolved solids (TDS) levels remained below the limit for the entire year. The remediation plans to address the elevated levels of TDS in holding pond discharges have had a positive effect overall. The holding pond pH strayed just above its discharge limit of 9.0 on one occasion only, but was quickly restored to normal. Holding pond releases of other non-radioactive parameters proceeded in accordance with the Federal-Provincial Review Committee (FPRC) release criteria.

Most of the chemical parameters of the off-site surface waters were below the FPRC holding-pond water release criteria, with the exception of iron. This exception appears to relate to natural phenomena, and not to URL operations. In spite of the levels of TDS in the holding pond, the off-site surface waters remain well below the regulatory limits.

Ambient radiation levels in air were at background levels. Similarly, underground radon levels and exposures were well below their corresponding action or intervention levels, even with a reduction in ventilation flow.

3.1.2.2.3 SP Site

Periodic monitoring results of Sheridan Park sewer effluents by the Region of Peel during 2007 were consistently below the limits for the parameters for wastewater streams.

3.1.2.3 CRL Thermal Emissions

The temperature rise in the Process sewer is primarily from the once through cooling of the 125-megawatt (thermal) NRU Reactor. Work, initiated in the winter of 2005, on the thermal plume of NRU cooling water discharges to the Ottawa River and delineation of the mixing zone was documented in CW-509241-REPT-001 Rev 0, AECL Annual Environmental Performance Report for 2005.

The most recent data in Figure 3-7 illustrates that the mean effluent temperature rise between ambient river and Process Sewer discharge at CRL in 2007 is consistent with the 5-year average.

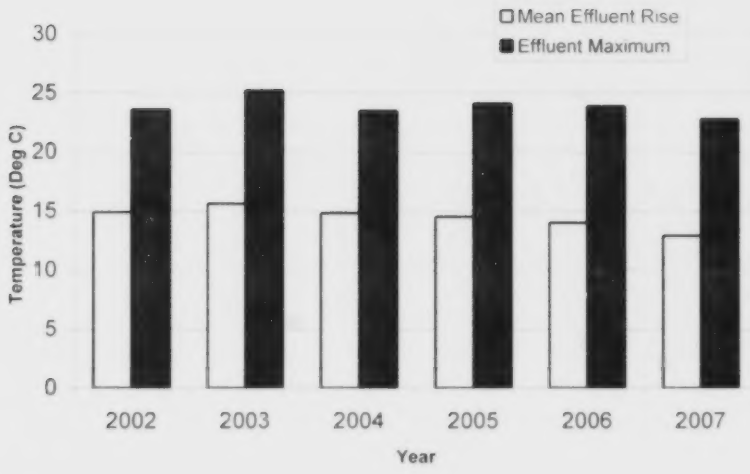

Figure 3-7 Temperature at the Process Sewer Discharge

3.2 Waste Generation and Management

It is AECL's practice to minimize waste generation, and to manage both radioactive and non-radioactive wastes in a safe and responsible manner, meeting the requirements of applicable environmental regulations and standards.

AECL generates a variety of radioactive and non-radioactive wastes in the course of operating, and in some cases decommissioning its sites and facilities. In addition, AECL provides a service by accepting and managing radioactive wastes from numerous Canadian universities, medical institutions, and industries, as well as providing interim safe storage for wastes resulting from the remediation of some non-AECL sites historically contaminated with radioactive material. The principal regulatory requirements applicable to the generation and management of radioactive wastes are those of the Canadian Nuclear Safety and Control Act (NSCA) and its associated Regulations, and the regulatory policies of the CNSC. Radioactive waste management facilities on AECL sites are operated in accordance with licences issued by the CNSC.

3.2.1 Solid Radioactive Waste Generation and Management

AECL continued to manage all solid radioactive wastes generated at facilities on AECL sites, as well as wastes received from external generators by emplacing them in monitored storage facilities located on AECL sites. Wastes generated and received at AECL sites in 2007 were stored in appropriate facilities, based on the potential hazard they represent to people and the environment.

3.2.1.1 Radioactive Waste Generation – CRL

As shown in Table 3-8, activities at the CRL site continued to account for the largest volumes of radioactive waste generated and placed in storage within AECL sites in 2007. The CRL site

houses the majority of AECL's waste management facilities and the largest inventory of stored radioactive wastes. In addition, the CRL site serves as the destination for much of the radioactive waste generated at other AECL sites, and the majority of wastes received by AECL from external organizations. Annual volumes of low-level radioactive wastes generated at CRL and stored in the CRL Waste Management Areas (WMAs) during the current and for each of the past five years are shown in Figure 3-8.

For comparative purposes, the total low-level solid waste generated through normal operations at AECL sites is included in Table 3-8. This total includes the waste stored in the Sand Trench, Low-Level Storage Buildings and in Bunkers, but does not include waste designated as Stockpile since this waste is re-used on the site, and the volume varies considerably from year to year. Waste diversion programs associated with the operation of the Waste Management Areas at CRL, designed to minimize the quantities of low-level solid waste, operated efficiently in 2007, and have achieved their maximum effectiveness in terms of waste reduction capability. Further reductions in the volume of low-level radioactive waste will require changes to processes and procedures on the part of the Generators of the waste at the CRL site.

Table 3-8
Volume of Solid Radioactive Wastes Produced and Handled by AECL

Waste Generator Site	Type of Activity	Destination of Waste	Volumes to Destination Facilities (m^3)					
			Sand Trench (CRL)	Low Level Storage Buildings	Above Ground Stockpile (Soils, etc.)	Low Level Engineered Structures (Bunkers)	High Level Engineered Structures (Tile Hole, Canisters)	Total Low Level Waste (m3)
NON-AECL WASTE – 2007								
Commercial	Operation	CRL	0	143.5	0	9.6	8.0	153.1
Historic Sites	Remed.	*LLRWMO	0	0.1	282.2	0	0	282.3
(LLRWMO)	Remed.	CRL	0	0	0	0	0	0
AECL GENERATED WASTE – 2007								
AECL CRL	Operation	CRL	0	681.4	0	211.0	35.0	892.4
	Construction	CRL	0	0	0	0	0	0
	Decomm.	CRL	0	0	0	0	0	0
AECL WL	Operation	WL	0	19.6	0	35.6	9	55.2
	Decomm.	WL	0	29.4	0	53.4	0	82.8
AECL G1	Decomm.	G-1	0	0	0	0	0	0
AECL Doug Pt	Decomm.	DP	0	0	0	0	0	0
AECL NPD	Decomm.	CRL	0	0	0	0	0	0
AECL SP	Operation	CRL	0	1.0	0	0	0	1.0
TOTAL ANNUAL AECL GENERATED WASTE								
** Total AECL Waste – 2006	Operation		0.4	851.0	114.0	254.2	41.4	1105.6
	Construction		0	0	0	0	0	0
	Decommiss		0	0	0	23.4	0.1	23.4
**Total AECL Waste – 2005	Operation		0.0	1207.8	416.0	246.2	40.8	1454.0
	Construction		0	0	0	0	0	0
	Decommiss.		0	0.4	0	48.8	0.5	49.2
** Total AECL Waste – 2004	Operation		9.2	995.5	635.0	277.6	32.7	1282.3
	Construction		0	0	0	0	0	0
	Decommiss.		0	7.9	0	33.4	0.2	***41.3
**Total AECL Waste – 2003	Operation		46.2	648.6	0	347.4	37.4	1042.2
	Construction		0	0	366.0	0	0	0
	Decommiss.		0	73.8	0	65.7	0.4	***139.5
**Total AECL Waste – 2002	Operation		135.1	73.9	2630.8	566.3	35.5	775.3
	Construction		0	0	0	0	0	0
	Decommiss.		0	0	0	0	0	0

Notes: * The LLRWMO maintains several licensed and unlicensed sites across Canada for interim storage of waste generated through clean up of historically contaminated (non-AECL) sites on behalf of Natural Resources Canada.

** Total, excluding waste received from organizations external to AECL, and historic wastes accepted for management by the LLRWMO.

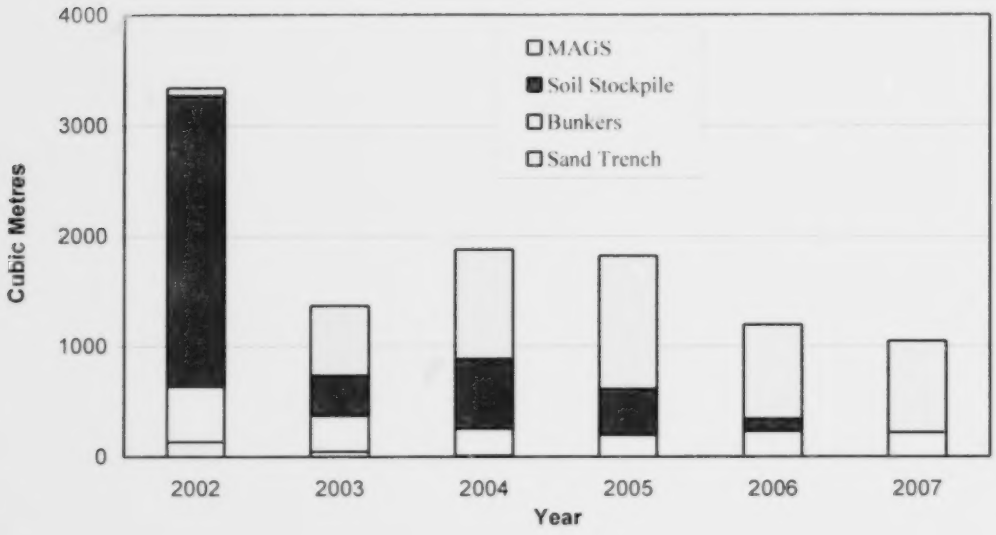

Figure 3-8 Total CRL Generated Low Level Waste Emplaced in CRL WMAs

3.2.1.2 Radioactive Waste Management – CRL

Low-level radioactive wastes representing moderate hazard were stored in engineered containment structures, either the Modular Above Ground Storage (MAGS) or below ground storage, both typically having some limited radiation shielding. High-level, high-hazard wastes were stored in heavily radiation-shielded engineered containment structures either above or in-ground

In 2007, construction began on the first unit Shielded Modular Above Ground Storage (SMAGS) facility. These structures replace both the existing MAGS and engineered bunkers. The first unit will enter operation in early 2008.

CRL Waste Management Operations staff also continued to work with CRL facilities to improve the characterization, segregation and minimization of wastes being generated. Operation of a proactive waste-segregation program at CRL continued throughout 2007. The program employs segregation at source and thorough monitoring to divert wastes, which might otherwise be stored as "suspect" radioactive waste, to non-radioactive waste facilities or recycling. The waste-diversion program resulted in the diversion of about 2639 m^3 of waste from radioactive waste storage (see Table 3-9).

Table 3-9
Waste Diverted from Radioactive Waste Storage Disposal at CRL (m^3)

Year	Waste Diverted to Landfill		Waste Diverted to Reuse or Recycle	
	On-Site	Off-Site (Municipal)	On-Site	Off-Site
2007	2207	0	0	432
2006	3540	0	0	582
2005	2779	0	0	350
2004	3166	243	0	290
2003	2007	0	0	180
2002	2267	0	1	191

In 2004 CRL sewage sludge (after de-watering) was transferred to above ground storage units. At year-end 2007 there were 23 units, each holding 16 m^3. A project is underway to develop a landfill structure to accept the sewage sludge. The landfill structure has been designed to meet the standards developed in Ontario by the Ministry of the Environment (MOE), General Waste Management, Environmental Protection Act Regulation 347 and Guideline on the Regulatory and Approval Requirements for New or Expanding Landfill Sites, Provincial Act Regulation 232/98. The landfill will include the design of an engineered double-lined landfill with a leachate collection system for the disposal of the sludge. A proposed site and an alternate for this landfill were selected for technical assessment in 2005 using a formalized Site Selection Process conducted by a multi-disciplinary team. The preferred location is a field area of approximately 67,400 m^2 at the CRL site, South of WMA C.

3.2.1.3 Solid Radioactive Waste Generation and Management – WL

All solid radioactive wastes generated at WL during 2007 were stored at the Whiteshell Waste Management Area (WMA) facilities. Annual volumes of low-level radioactive waste stored during 2007 and for each of the past five (5) years are shown in Figure 3-9. A marked increase in 2007 resulted from decontaminating shutdown laboratories during accelerated decommissioning of the core of Building 300. This effort continues. Smaller increases in 2004 and 2005 reflected work primarily associated with cleanout of WL Hot Cells #6-11, and transfer of the Amine Liquid Waste from the WMA to the Shielded Facilities.

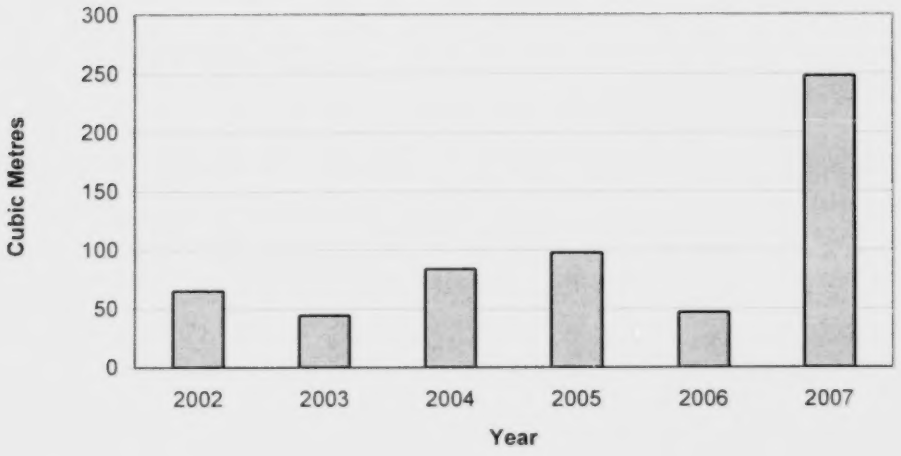

Figure 3-9 Low Level Solid Radioactive Waste Emplaced in WL WMAs

3.2.1.4 Solid Radioactive Waste Management – Other Sites

The Low Level Radioactive Waste Management Office (LLRWMO) continued to manage, monitor and inspect several storage areas containing low-level radioactive wastes resulting from remediation and/or consolidation of materials at various historically contaminated (non-AECL) sites within Canada.

In 2007 November, the LLRWMO conducted an "over-packing" operation at Waste Management Area "D", CRL. A total of 150 drums were placed into 25 "over-packs" in Building 563

3.2.2 Liquid Radioactive Waste Generation and Management

3.2.2.1 Liquid Radioactive Waste Generation

Liquid radioactive wastes generated at AECL sites, other than those wastes solidified at source, are managed by one of the following means:

- Collection and treatment of low-level radioactive wastewater to remove and solidify contaminants (at CRL this is collected by the Active Drain System (ADS) and treated by the WTC on site) prior to controlled discharge of the treated wastewater to local surface waters via the process sewer;
- Monitored discharge of very low-level radioactive wastewater to local surface waters via the process sewer system;
- Interim storage of low-level liquid wastes in tanks or drums;

- Interim storage of high-level liquid wastes in engineered tanks pending transfer to or development of appropriate treatment or processing facilities; and
- Interim storage of high & low-level radioactive hazardous chemical liquid wastes.

The volumes of low-level liquid radioactive waste produced, treated and stored in 2007 by AECL are shown in Table 3-10. Results of monitoring of the radioactive content of discharged wastewater are included in the data in Section 3.1.1 above.

Table 3-10
Volume of Low-Level Liquid Radioactive Wastes Produced and Handled

Waste Producer	Volumes (m^3)			
	Treated and Monitored Prior to Discharge to Surface Water	* Monitored Discharge to Surface Water	Monitored Ground Dispersal	Total Low Level Liquid Wastes
CRL	1776	2226	0	4002
WL	0	1303	0	1303
SP	0	1.44	0	1.44
NPD	0	21	0	21
Douglas Pt.	0	0	0	0
Gentilly-1	0	11	0	11
Total 2007	1776	3561	0	5337
Total 2006	2658	4513	0	7171
Total 2005	3220	5368	0	8588
Total 2004	3916	4514	0	8900
Total 2003	4386	4257	0	8643
Total 2002	3235	5278	0	8513

Notes: *Treatment not required. Excludes cooling water. These are discharges to the Process Sewer from the CRL B205 Tanks 46-E/F/G, or WL B200 Active Liquid Waste Treatment Centre (ALWTC).

3.2.2.1.1 CRL Site

The Liquid Waste Transfer and Storage (LWTS) Project, initiated in 2003 to deal with approximately 280 m^3 of high-level and intermediate-level liquid radioactive waste stored in 21 tanks on the CRL site, neared completion of the design portion for the Waste Storage System building in 2007. Also in 2007, the preliminary design stage for equipment to be used for retrieval and transfer of the waste neared completion. A waste composition database was completed, and a mock-up test rig was designed for the retrieval and transfer of the Mo-99 liquid wastes. The Environmental Assessment Study Report for the LWTS Project was completed and submitted to the CNSC in 2005 April and was accepted in 2006 April. The CNSC concluded that the project, taking into account mitigation measures identified in the Environmental Assessment Screening Report is not likely to cause significant adverse environmental effects.

Management of low-level liquid wastewaters generated at CRL during 2007 is summarized in Figure 3-10, which shows the quantities of CRL wastewater discharged to the Ottawa River during the current and past five years. There were no discharges of wastewater to engineered in-ground dispersal pits in the CRL Liquid Dispersal Area during 2007, and none are expected to be made in the future without obtaining permission of CNSC.

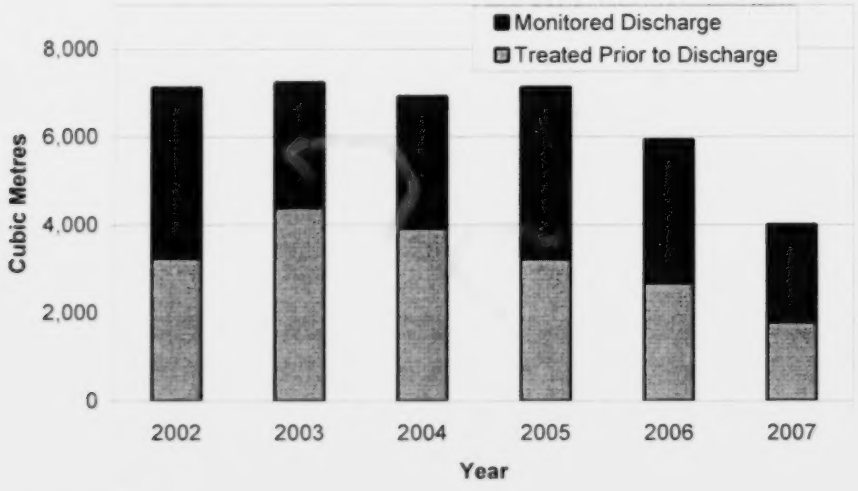

Figure 3-10 Discharges of Low Level Radioactive Wastewater at CRL

In 2007 the WTC processed 100% of the low level radioactive wastewater fed to the facility. Work on upgrading Waste Treatment Centre systems continued. The reliability of the Liquid Waste Immobilization System was improved by replacing the Thin Film Evaporators and associated equipment. These upgrades improved the overall efficiency for removal of radioactive contaminants.

3.2.2.1.2 WL Site

At WL, monitoring programs are in place to ensure that wastes are below radioactive release criteria prior to discharge. The annual volumes of low-level radioactive wastewater collected at the WL Active Liquid Waste Treatment Centre (ALWTC), and monitored prior to controlled discharge to the Winnipeg River, is shown in Figure 3-11. In 2007, 1303 m^3 was released. As can be seen, the volume has remained relatively constant over the past six years. Approximately 80% of the total comes from washing re-usable personal protective equipment and clothing, which is required both for operations or decommissioning activities.

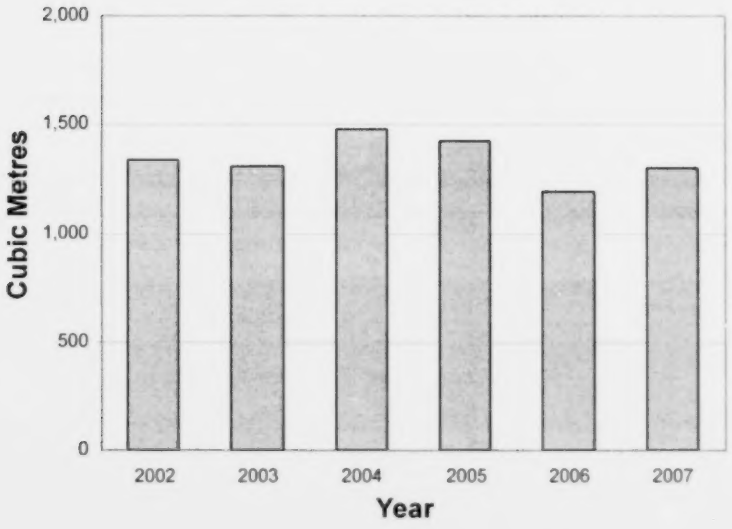

Figure 3-11 WL Discharges of Low Level Wastewater to the Winnipeg River

Efforts continue towards achieving a system to provide treatment for all low-level liquid wastes prior to discharge from WL. Currently, very little can be done to remove radiological or non-radiological contaminants. Although a feasibility study to add new comprehensive processing capability to the ALWTC facility (in Building 200) was conducted previously, the cost was high. Moreover, new equipment would have to be abandoned in a few years for a move to another enabling facility (planned for the Immobilized Fuel Test Facility), so that Building 200 could be decommissioned.

An alternative approach was proposed in 2006, to make minor modifications to the existing ALWTC, permitting at least manual waste processing via physical and chemical means. This interim measure could remove the most common contaminants from waste streams where they are anticipated. To that end, modification options underwent engineering assessment, and were made ready for executive and regulatory approvals.

As approvals were awaited, contaminant problems remained. Another approach was taken in 2007 for the most troublesome waste stream, from the Decontamination Centre (Building 411). There, chiefly chemical means were used to remove radioactive contamination from tools or decommissioned articles, to be reused or recycled. These treatments add harsh cleaning chemicals (such as phosphate, chloride and strong acids or bases) and/or dissolve non-radiological components (such as iron, copper, zinc, etc.) from the substrate. Each contaminates the wastewater. Beginning in September, chemical use was eliminated as much as possible, in favour of mechanical removal by cutting, abrading or scraping. Where chemicals could not be avoided, the wastewaters were collected and left to evaporate. In either case, the wastes were small in volume and could be stored easily as solids. This approach has proved to be very

successful. For other waste streams, the best use is being made of existing capabilities, passive absorbers, as well as detective work to try to trace the source of each excursion back to its source.

3.2.2.2 Liquid Radioactive Waste Management

AECL continued in 2007 to maintain inventories of stored high-level and low-level radioactive liquid wastes that have accumulated at the CRL and WL sites, awaiting the development of appropriate treatment processes. The year-end inventory for each of the current and past five years is shown in Table 3-11 and Figure 3-12.

As shown in the data in Table 3-11, medium and high-level liquid wastes stored in tanks at CRL continue to be stored with added volumes remaining relatively low. In 2007 there was a concerted effort to ship the drummed inventory of organic and aqueous wastes, stored in the WMA's, to off-site disposal agencies in the United States.

For WL, all new wastes in this category were processed during the year. A small backlog is awaiting processing by a contractor and shipment off-site.

Table 3-11
Inventory of Radioactive Liquid Wastes in Interim Storage at AECL Sites in 2007

	*Interim Tank Storage (Medium and high level liquids) (m^3)			Interim Drum Storage (Organic & Misc.) (m^3)		
	Added	Removed/ Processed	Year-End Inventory	Added	Processed/ Treated/Shipped	Year-End Inventory
CRL	1.7	20.8	305.1	34.3	110.0	48.6
WL	0	0	0.3	3.9	3.9	0.4
Total 2007	1.7	20.8	305.1	38.2	113.9	49.0
Total 2006	1.9	0	***324.2	14.3	42.3	170.0
Total 2005	4.2	7.9	***322.3	93.0	30.5	**82.0
Total 2004	6.8	3.8	***326.0	40.6	9.5	242.7
Total 2003	12.1	13.1	***323.0	7.1	5.0	199.8
Total 2002	5.3	13.2	***324.0	5.3	13.2	320.6

Notes: * Does not include wastewater stored in tanks within waste treatment facilities waiting processing.

** Value changed from 64.6m^3 found in the Environmental Performance Report for 2005 to the correct value of 82m^3

***Error in previous years reported Year-End Inventory for 2002 to 2006 corrected for the 2007 report.

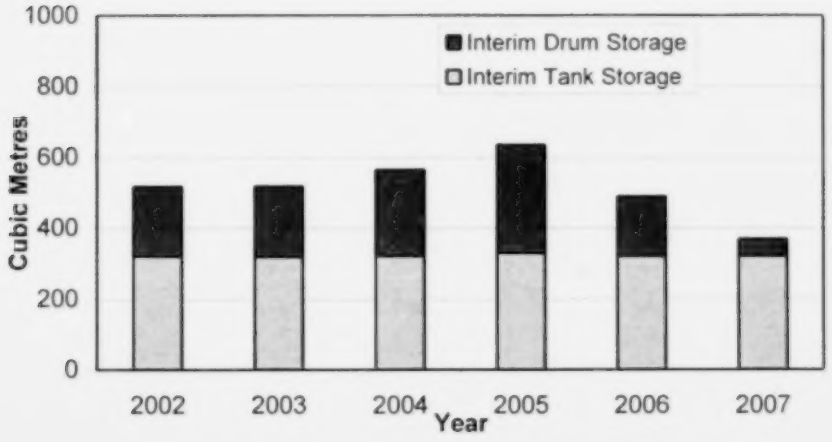

Figure 3-12 Year-End Inventory of Stored Radioactive Liquid Waste in Tanks and Drums at AECL

3.2.3 Non-Radioactive Waste Management

AECL also generates a variety of non-radioactive wastes in the course of operating and decommissioning its sites and facilities. To minimize the quantities of non-radioactive waste requiring disposal, AECL sites continued to operate recycling programs. Residual wastes were either managed on-site or were shipped off-site to appropriately licensed waste management facilities. The total weight of batteries recycled at CRL is now tracked and reported in the "Recycled Off-Site" section of Table 3-12, rather than the total number of individual items. Table 3-12 summarizes the quantities and destinations of non-radioactive wastes generated at AECL sites, including quantities of wastes recycled. AECL is working towards achieving the target of recycling 35% of its annual non-radioactive waste generated.

Table 3-12
Non-Radioactive Waste Management at AECL Sites in 2007

	Non-Hazardous Solid Waste			Hazardous & Liquid Industrial Waste		
Site Generating Waste	**To On-Site Landfill**	**To Municipal Landfill**	**Recycled Off-Site**	**Off-Site Disposal**	**Recycled Off-Site**	**Incinerated On-Site (WL only)**
*CRL	4372 m^3	48 m^3	1956 m^3	2200 kg solids 9255 L liquids	0	0
CRL (Decommiss)	623 m^3	1104 m^3	120 m^3	0	0	0
WL (& URL)	768 m^3	337 m^3	541 m^3	6007 kg solids 3303 L liquids	0	1.4 m^3
SP	0	195 tonnes	585 tonnes	3718 L Liquid + 20 kg Gases	0	0
Other Sites LaPrade, Glace Bay, NPD	<1 m^3	1 m^3	1.2 m^3	0	0	0

Notes: * Waste totals for CRL include wastes from the Waste Diversion Project (see Table 3-9).

AECL continued to operate landfill sites for non-hazardous solid waste at the WL and CRL sites in conformance with the applicable Ministry of the Environment guidelines and in compliance with Federal regulations. Some wastes from each site are also sent to local municipal landfill sites, where appropriate.

Non-radioactive hazardous and liquid industrial wastes generated at AECL sites continued to be collected for off-site disposal or for recycling. All off-site disposal or recycling was carried out in conformance with applicable Provincial regulations. Non-radioactive waste volumes generated from other AECL sites not included above were negligible in 2007.

3.2.4 Recycling

AECL continued in 2007 to strive to conserve resources through application of the "3 R's" – reduce, reuse and recycle. AECL sites continued to operate recycling programs in 2007 in order to reduce the quantities of waste requiring disposal. Table 3-13 summarizes the types and quantities of materials recycled from major AECL sites during the year.

The LLRWMO recycles materials at its Port Hope and Ottawa offices via the local municipal recycling collection systems.

Table 3-13
Recycling at AECL Sites in 2007

Description	CRL	WL	URL	*SP
Paper	95 m^3	4731 kg	2.1 m^3	450 tonnes
Cardboard	659 m^3	1264 kg	3.1 m^3	41.45 tonnes
Glass & Aluminium Cans	51 m^3	114 kg	0.22 m^3	19.27 tonnes
Scrap Metal	1228 m^3	43225 kg	Included with WL	0
Plastics	0	0	1.7 m^3	19.27 tonnes
Wood & Building Materials	43 m^3	0	0	54.80 tonnes
Other	0	0	0	0

Note: * Computers and monitors are recycled but not tracked.

3.3 Nuclear Legacy Liability Management

AECL created the Liability Management Unit (LMU) on 2005 April 1 with the mandate to manage AECL's and the Government of Canada's program to address the nation's nuclear legacy liability obligations. The Nuclear Legacy Liability Program (NLLP) has a long-term focus on safely addressing nuclear facility liabilities on AECL sites and managing the associated wastes. The facilities include those from the early years of Canada's nuclear program, prior to the creation of AECL in 1952. LMU-managed activities include the monitoring and stabilization of shutdown facilities and contaminated lands, decontamination and dismantling projects, and storage and disposal of the residual wastes. These activities require the construction of major enabling facilities for waste analysis, treatment, packaging, storage and disposal. The program is designed to achieve health, safety and environmental protection objectives in accordance with CNSC regulations and the objectives of AECL's Environmental Protection Program. The LMU maintains formal decommissioning plans that guide the execution of the work and address decommissioning obligations extending several decades into the future. Short-term planning is based on periodic reviews of program priorities for critical decommissioning and waste management activities, based on environmental and other risk factors.

Progress in LMU-managed activities in 2007 included advancing of the two major multi-year projects to construct long-term storage facilities for radioactive liquids and used fuel wastes. As part of the Stored Liquid Waste and Transfer Project (LWTS) design contracts were signed and progress on the design for the Waste Storage System (WSS) was at the 100% complete stage at year-end. In the case of the Fuel Packaging and Storage Project (FPS), the design and supply contracts for the fuel handling components, the fuel drying and re-packaging stations were almost 100% complete. These two major projects are expected to be commissioned in 2009 and 2010, respectively. Other activities in 2007 included the dismantling of redundant and aging experimental facilities and buildings including substantial progress on buildings 107 and 204. As part of the LMU program ongoing monitoring and surveillance of facilities no longer in operation continued at CRL and WL, and also at the prototype CANDU reactors at Rolphton and Douglas Point, Ontario and Gentilly-I, Quebec along with the Heavy Water site at Glace, Bay Nova Scotia.

3.3.1 Chalk River Laboratories Site

Groundwater Treatment

Two automated treatment systems and one passive system continued to remove radioactivity, primarily Sr-90, from three groundwater in three plumes. Approximately 2.4 million litres of groundwater from a plume discharging to the east of WMA B (referred to as the Spring B Groundwater Treatment Plant) were treated to remove greater than 99% of the Sr-90. A total of 2.9 GBq of Sr-90 was removed and solidified with cement in twelve 205-L drums for storage. Approximately 3.12 million litres of groundwater from a plume from the now-closed Chemical Pit, situated northeast of WMA A, was treated to remove 2.45 GBq of activity. Eight 205-L drums of solid waste was created from this activity.

The passive wall & curtain remediation system continued to channel groundwater flows containing Sr-90 from the shut down Ammonium Nitrate Decomposition Plant, capturing 99% of the Sr-90 present in the groundwater plume. In 2007 more than 10.7 million litres passed through the curtain avoiding the discharge of 3.9 GBq Sr-90 of activity into Duke swamp. The total capture since installation has been 35 GBq Sr-90.

A study is now underway for a fourth treatment facility which will treat water from the south swamp.

Decommissioning Operations

Decommissioning at CRL encompasses (i) legacy waste areas, and (ii) facilities and buildings that have been shut down and formally turned over to Decommissioning, including both those in a passive Storage-With-Surveillance (SWS) state and those in which projects are being conducted. In 2007, twenty-one (21) buildings were within the Nuclear Legacy Liabilities Program. Major accomplishments in 2007 included:

- Treatment of contaminated groundwater (Legacy Waste Areas – see above);
- Treatment and processing of waste from B107;
- B204A Fuel Storage Bays water removed and preparation work for dismantlement of approximately one hundred feet of the building commenced;
- Approximately fifty-five (55) ton of lead was removed and shipped to be recycled for use off site in the nuclear industry;
- Initiation of work in support of determining feasibility of the establishment of a geological disposal facility at the CRL site;
- Disposal of wastes from the lysimeter research site (Legacy Waste Areas) completed;
- Removal of wastes from six (6) of eight (8) drums in solvent bunker #1 from WMA B;
- Removal of NRX fuel rod sections from WMA A;
- Waste Analysis Facility construction completed and placed in service;
- Characterization and analysis activities for the sediment near the AECL process sewer outfall in the Ottawa River (Legacy Waste Areas) continued; and

- Investigation of approaches for the treatment of contaminated groundwater affecting the South Swamp.

In summary, documented Decommissioning Plans are in place for all facilities as required by the CNSC. By the end of 2007, three buildings were in a safe shutdown state, seventeen (17) buildings were in preparation for Storage with Surveillance, and one new facility was added. In addition, initiatives have been completed to address decommissioning tasks as outlined above.

3.3.2 Whiteshell Laboratories Site

During 2007, several decommissioning initiatives for the WL site were completed to reduce future liabilities. Cementation of amine radioactive liquid waste was completed, as well as construction of the Active Liquid Waste cementation storage bunker. The Shielded Facilities Storage Block and the Immobilized Fuel Test Facility (IFTF) canisters were safely decommissioned. Approximately two-thirds of the total office and radioisotope laboratory space in Building 300 was stripped down to the bare walls, in preparation for the removal of the active exhaust ventilation devices and fan systems. A Waste Clearance Facility, to appropriately disposition wastes generated by decommissioning activities, was established in an existing building, and made operational. In addition, all redundant non-active boreholes have been decommissioned. Building 400 (Administration) and Building 406 (Cafeteria) were prepared for demolition in early 2008.

There were no major excavation or construction activities undertaken at the URL during 2007, but considerable progress was made toward its closure. Most fittings and fixtures were removed entirely from the mine and vent raise.

3.3.3 Other Sites

NRCan continued to fund LLRWMO's major project, the Port Hope Area Initiative (PHAI). The PHAI is composed of two distinct projects, the Port Hope and Port Granby Low-Level Long-Term Radioactive Waste Management Projects, established to clean up various sites contaminated with historic low-level radioactive waste and to construct and operate facilities for the long-term management of the wastes. In its role as Proponent for the PHAI, the LLRWMO continued its technical work in support of an environmental screening for the Port Granby project, conducted at the comprehensive study level, pursuant to the Canadian Environmental Assessment Act (CEAA). The final environmental screening report for the Port Granby Project is still to be issued by the Responsible Authorities (NRCan, CNSC). The Port Hope project screening report was released by NRCan during the previous reporting period.

3.4 Environmental Incidents

In 2007, there were forty-one (41) environmental-related incidents logged for CRL, three (3) for WL and two (2) for SP. There were no environmental incidents for Gentilly-1 Waste Management Facility, the Nuclear Power Demonstration Waste Management Facility, the Douglas Point Waste Management Facility or, the areas under surveillance of and monitored by the LLRWMO.

All environmental incidents at WL, SP and CRL, which were determined to be environmental-related, were investigated as required, mitigated when possible, and corrective actions implemented when required in order to prevent the recurrence of similar incidents. A total of fifteen (15) incidents were reportable to external regulators (ten (10) being Halocarbon releases reported semi-annually under the *Federal Halocarbon Regulations*, one (1) being to the Mississauga Fire Department, and the other four being reported to the CNSC, the MOE Spills line or both). The CRL incidents actual impacts to the environment had ratings of none or negligible.

At WL, there were only three (3) environmental incidents in 2007. Impacts to the environment for two (2) of them were rated as "minor", while the third was "negligible". Two (2) were reported to the CNSC and/or Environment Canada, as appropriate, while the third was not, as it had negligible environmental consequence.

There were two (2) incidents in 2007 at Sheridan Park, and no incidences on other sites managed through SP (Montreal, Ottawa).

3.5 Land Management Stewardship

3.5.1 Road Salt

As a safety measure salt was used as a de-icing agent on roadways within the various AECL sites during the winter season. A summary of the road salt usage at the AECL sites is given in Table 3-14.

As a result of the addition of road salt to Schedule 1 of the Canadian Environmental Protection Act (CEPA), the Department of the Environment issued a preliminary *Code of Practice for the Environmental Management of Road Salts* in 2004 April. The access road to the CRL site is not considered public therefore CRL is not obliged to prepare and implement a salt management plan however, for due diligence purposes, CRL has developed and implemented a *CRL Salt Management Plan* in 2006 October. During the review of CRL's management practises, CRL concluded that a new Salt Storage facility was required. Consequently, a new Salt Storage Facility, based on Transportation Association of Canada (TAC) guidance, designed to store and handle road salt in compliance with emerging provincial and federal guidelines was completed in 2007/08. In addition, individuals responsible for the application of road salt on site participated in on-the-job best practice training.

Table 3-14
Summary of Road Salt Usage

Site	Approximate Distance (Roads, sidewalks, etc.) (km)	Amount (tonnes)					
		2002	2003	2004	2005	2006	2007
*CRL	54	418	424	597	968	300	1096
WL + URL	10	2	10	7	9	8	4
**SP	42	120	120	225	150	80	120
NPD	2	0	0	0	0	0	0

Notes: * CRL includes two hectares of parking lots.
**Sheridan Park uses a sand/salt mixture.

At CRL, salt was applied directly to the main plant road, a distance of about 7 km, and a mixture of sand and salt was used on a total of about 47 km of other roads within the property. At the other sites, sand/salt is applied to the roads, sidewalks and parking lots, or pure salt to building steps.

3.6 Energy and Resources

3.6.1 Heat, Light and Processes

Energy consumption at AECL sites during 2007 is summarized in Table 3-15 along with totals for the five previous years for comparison. Using the appropriate conversion factors for the fuel oil, propane and electricity, the total consumption for the sites was calculated and is given in terajoules (TJ).

At CRL, recovery of the waste heat from the NRU Reactor was not possible during 2007 due to the suspension of the fuel-testing program, pending the loops refurbishment. U-2 loop remained unfuelled during 2006 and 2007 with the result that no heat recovery took place and no CANDU fuel or materials testing was possible in reactor. U-2 is undergoing a major refurbishment and re-qualification and is not scheduled to operate again before 2008.

The propane consumption at CRL is a result of the heating requirements for the Biological Research Facility and several other small outer facilities. This propane use at the outer buildings is required because of the difficulties in transporting steam from the central plant to these buildings.

Building Energy End-Use-Intensity at AECL owned and operated sites in Canada is presented in Table 3-16. An external consultant was procured to complete an assessment of potential energy savings options at CRL. An assessment of the site with the greatest energy consumption and implementation of recommendations is a target captured in the 2007/08 Environmental Plan.

Table 3-15
Energy Consumption at AECL Sites for Heating, Lighting & Processing in 2007

Energy (Heat, light & Processes)	WL	URL	CRL	SP	*Other Sites	2007 Total	Annual Total Equivalent Energy in terajoules (TJ/y)					
							2007	2006	2005	2004	2003	2002
Electricity (kW/h)	14410101	2810443	64666620	12786426	1250000	95923590	345	364	349	361	374	389
Heating Oil (L)	3364673	0	10974392	0	0	14339065	559	542	570	598	565	566
Natural Gas (m^3)	0	0	0	834130	0	834130	26	29	24	27	32	22
Propane (L)	12936	67081	539969	0	0	619986	17	15	16	18	19	19
Total Equiv. Energy (TJ)	183	12	675	77	5	952	952	950	920	1005	990	996
Heated Floor Area -approx. total (m^2)	51394	3910 m2 and 34000 m3 underground	305597	49266	24000	434167						
NRU Waste Heat Recovered (TJ)	0	0	0	0	0	0	0	0	22	60	40	41

Notes : 1 TJ = 1 terajoule = 1 x 10^{12} joules (1 watt = 1 joule/second)

1 BTU = 1 054.615 joules

*Other sites include LaPrade, NPD, Douglas Pt. and G-1.

Table 3-16
Energy End-Use-Intensity at AECL Sites

Energy (Heat, light & Processes)	2007	5-year average	2006	2005	2004	2003	2002
Total Equiv. Energy (TJ)	952	972	950	920	1,005	990	996
Heated Floor Area -approx. total (m^2)	434167	276150	305597	269452	265700	270000	270000
Energy End-Use-Intensity $MJ/m^2/a$	2121	3345	2188	3400	3781	3667	3689

In accordance with Schedule II of the Registration of Storage Tank Systems for Petroleum Products and Allied Petroleum Products on Federal Lands Regulations, AECL is required to submit a Compliance Summary Report to Environment Canada annually. While some aboveground tanks still do not comply with Federal guidelines, all underground storage tanks are compliant with Federal Technical Guidelines. Work is continuing in this area, with AECL meeting its obligations to provide summary reports on an annual basis. New regulations are expected to be put into place in 2008.

3.6.2 Vehicle Fuel Use

Consumption of fuels by AECL's vehicle fleet at AECL sites during 2007 is summarized in Table 3-17 along with totals for the five previous years.

Table 3-17
Vehicle Fuel Consumption at AECL Sites in 2007

Fuel Type	Units	WL	URL	CRL	SP	2007 Total	2006 Total	2005 Total	2004 Total*	2003 Total	2002 Total
Gasoline	L	26870	11042	9434	13525	60871	90742	218201	212841	268151	162234
Propane	L	15467	0	0	0	15467	0	0	5400	5400	4543
Diesel	L	10300	2802	192465	0	205567	181145	154261	158469	229071	114250
Ethanol Blended	L	0	0	162188	0	162188	110088	0	0	0	0

AECL continued to operate and maintain fleets of vehicles at the CRL, WL and URL sites and a small number of vehicles at some other sites for operational, maintenance and transportation purposes. At the end of 2007 AECL's fleet of owned or leased vehicles consisted of 109 automobiles, vans, light and medium duty trucks. Of these, eighty-six (86) were fuelled with gasoline, and twenty-three (23) were fuelled with diesel. In 2007, CRL non-diesel vehicles were all fuelled with Ethanol Blended fuel. Because of availability, this practice could not be adopted

at WL before 2008. However, vehicles at all sites that are re-fuelled off site are encouraged to use blended fuel where available.

3.7 Management of Designated Toxic Substances

3.7.1 Ozone Depleting Substances

In accordance with the Montreal Protocol, Federal and AECL policies, AECL continued to phase-out and consider alternatives to the use of substances such as chlorofluorocarbons (CFCs), Hydrochlorofluorocarbons (HCFCs) and Halons.

Approximate inventories of ozone-depleting substances (ODSs) in equipment and in storage at AECL sites as of the end of 2007 are summarized in Table 3-18. Also included in the table is a comparison with previous years' inventories. While inventories have remained relatively constant over the past several years, work is continuing at all sites towards eliminating all ODSs at AECL by 2020.

Table 3-18
Inventories of Ozone Depleting substances and Related Halocarbons at AECL Sites, 2002-2007

Substance Type [Ozone Depleting Potential (ODP)]	Use/Application	2007				2006	2005	2004	2003	2002
		CRL (kg)	WL (kg)	SP (kg)	Total (kg)	Total (kg)	Total (kg)	Total (kg)	Total (kg)	Total (kg)
Halons *[ODP ~ 3 – 10]*	Fire Suppression Systems	12	889	0	901	901	1433	1475	1475	1239
CFCs & Blends (e.g. R-11, R-12, R-113, R-503) *[ODP ~ 0.5 – 1.0]*	Refrig. & Air Cond. Systems	78	1874	0	1952	1894	1907	1926	2169	1723
	Storage (includes solvents)	85	388	0	473	473	465	465	480	1204
	Thermalhydraulics Research	0	0	0	0	0	0	0	0	0
HCFCs (e.g. R-22, R-123) *[ODP ~ 0.02-0.06]*	Refrig. & Air Cond. Systems	1839	310	20	2169	2293	2684	2683	2597	2761
	Storage (includes solvents)	349	175	525	1049	646	531	463	931	493
	Thermalhydraulics Research	0	0	0	0	0	0	0	0	0
HFCs (e.g. R-134a) *[ODP = zero]*	Refrig. & Air Cond. Systems	104	8	711	823	935	822	746	764	679
	Storage (includes solvents)	20	22	0	42	76	59	77	56	28
	Thermalhydraulics Research	6294	0	0	6294	6294	5500	5500	5500	4900

Existing Halon fire-extinguishing systems in some critical areas, the NRU Reactor control room and Recycle Fuel Fabrication Laboratory (RFFL) facility, remain in place for safety reasons. Replacement systems' offering equivalent levels of effectiveness and personnel safety was investigated during 2006. During 2007, WL did not change any of its Halon systems, however possible replacements for remaining systems and potential receivers for surplus Halon were both investigated. Current thinking would favour elimination of virtually all such equipment, with little need for replacement.

AECL has shown progress in regards to the phase out of various halocarbons as defined in the Federal Halocarbon Regulations. A data base for identifying all equipment that is three (3) tons or greater has been completed. In CRL, an assessment of the different halon alternatives in RFFL is being issued. (RFFL-67541-TN-001, Halon Replacement Alternatives for the RFFL). The scope of work for the end of 2006/2007 was to document a plan to address the schedule and required funding to implement the halon replacement after the completion of the ACR Mixed Oxide (MOX) campaign. This campaign was continued in 2007, with current conclusions that FE-25.FM-200 can be considered as a back-up halon for existing RFFL systems and Novec 1230 has been recommended for hand held extinguishers. The actual replacement of the halon fire suppression system in the facility is expected to be completed well before 2010.

In WL and URL refrigerants from unused units continues to be recovered in 2007.

3.7.2 Poly-Chlorinated Biphenyls (PCBs)

AECL continued to maintain storage facilities for PCB waste at several of its sites, in compliance with federal regulations, and is striving to meet the Phase-out deadlines published in "Canada Gazette I " on November 4, 2006. These regulations have set the following PCB end-use dates:

- Phase-out of most high-level (>500 ppm) PCBs in-service, by the end of 2009;
- Phase-out of most low-level (50-500 ppm) PCBs in-service, by the end of 2014;
- Phase-out of most high-level and low-level PCBs from sensitive locations by Dec 31, 2009; and
- Phase-out of all pole-top (contaminated mineral oil), transformers, PCB light ballasts and specialized types of askarel (insulating liquids) and contaminated mineral oil electrical equipment at electrical production, transmission or distribution facilities by 2025.

A summary of PCB waste inventory remaining in storage at these sites along with PCBs still in service at AECL sites as of the end of 2007 is given in Table 3-19. Only one Outdoor Oil Filled Transformer is currently in service at AECL at SP, this transformer is not PCB-filled, however there is a second transformer in the SP-1 basement that is considered to be PCB-contaminated.

At CRL there were 155 light fixtures in service found to contain PCBs, all but eleven (11) of these were removed by the end of 2007. Also Waste Management has drained legacy oil into barrels and sent samples away for testing; oil will be removed from site. There are two (2) remaining drums of PCB oil on site, in the waste management PCB shed. Waste Management is working on their removal from site. Siemens has been contracted to find ways of saving energy, this will be accomplished through lighting upgrades on site over the next three years. Any ballasts that are still in service will be found and replaced through this project. Fire audits updated inventories based on analysis of units taken out of service added slightly to the totals for 2007, particularly for pole transformers. Efforts directed at eliminating PCBs in storage continued throughout the year.

At WL, the wastes storage backlog arising from earlier spills was removed completely.

Table 3-19
2007 Year-End Inventory of PCBs at AECL Sites

Site	Storage					In Service		
	Misc Solids & Debris (kg)	Liquids (L)	Light Ballasts (Items)	Capacitors or Misc. Equip (Items)	Transformer (Items)	Transformer (Items)	Light Ballasts (Estimated) (Items)	Capacitors (Items)
CRL	0	400	252 kg	12	0	12 (<25 ppm)	11	0
CRL (Suspect Radioactive)	200	19102	0	0	0	0	0	0
WL	0	0	~400	0	2	5	~7000	0
SP	0	0	0	0	0	2	0	0

3.7.3 Chlorine

Chlorine was used for water treatment purposes at both the CRL and WL sites in 2007. Process and firewater systems were shock-chlorinated on a regular basis to prevent fouling of piping systems and heat exchangers by algal growth. Water for domestic use was continuously chlorinated for health purposes. At CRL, the effluent from the sewage treatment plant was continuously chlorinated for disinfections.

Total consumption of chlorine for these purposes in 2007 at CRL was 3682 kg, which is lower than the 2006 (5014 kg), 2005 (4772 kg) and 2004 (4494 kg) values. The decrease in chlorine use may be attributed to the extended NRU shutdown, which occurred late 2007; CRL does not treat water with Chlorine when NRU is shutdown. At WL, chlorine use to disinfect the process and domestic potable water supplies in 2007 was 4483 kg, slightly above 2006 (4390 kg), but lower than 2005 (4603 kg) or 2004 (4594 kg). The level of consumptions parallels annual water use, which is most affected by building cooling requirements.

4. PUBLIC COMMUNICATIONS

Efforts continued in 2007-2008 to ensure that the local communities and stakeholders were kept apprised of AECL's operations. In this regard, the following activities took place.

4.1 Interactions with Federal, Provincial and Municipal Elected Officials

As key stakeholders, elected officials were advised of AECL's ongoing operations through meetings, briefings, letters seeking input on projects and licensing requirements, and through informal discussions at community events. Some of these are noted below:

- Chalk River Laboratories held community breakfast briefings with elected officials from Pembroke, Petawawa, Pontiac in 2007 August and Head, Clara and Maria in 2007 September.
- AECL initiated semi-annual meetings with the Algonquins of Pikwàkanagàn in 2006 that continued in September 2007. This was in addition to their participation as Observers in the Environmental Stewardship Council (ESC).
- The ESC met three times in 2007/08 and continued its dynamic interaction and advice to AECL-CRL.
- Nuclear Legacy Liability Program communication activities continue to ramp up towards some potential joint public consultation with NRCan in the areas surrounding Chalk River Laboratories and Whiteshell Laboratories.
- The entire Renfrew County Council, comprised of the Warden, all the local mayors and reeves (except the City of Pembroke), were at CRL for a VIP tour the morning of Oct. 31, 2007 and held a full County Council meeting at JL Gray building in Deep River that afternoon – the latter had not been done for nine years. The tour featured stops at several of CRL's environmental and waste management facilities.
- Several VIPs, including local MP and MPP celebrated the 50th anniversary of the National Research Universal (NRU) reactor at Chalk River Laboratories on Nov 02, 2007
- On several occasions, Site and Community Affairs staff had the opportunity to interact with elected officials on an informal basis. These occurrences took place off-site at various community events throughout the period.

In the Whiteshell area, regular Public Liaison Committee (PLC) meetings were held with local elected officials, provincial government representatives, site tenants and the Sagkeeng First Nation, in accordance with established Terms of Reference. Meetings with Sakgeeng First Nation are scheduled at regular intervals to keep them informed of the activities as WL. Currently there are no outstanding issues.

4.2 Positive Support from Communities for Licensing Activities

AECL was pleased to receive support from twelve (12) interveners associated with the application to renew the Dedicated Isotope Facility (DIF) license that would combine and align the two Multipurpose Applied Physics Lattice Experiment (MAPLE) reactors and the New Processing Facility (NPF) with the CRL site-operating license.

4.3 Environmental Stewardship Council

The Environmental Stewardship Council continued to meet throughout the period. In 2007 three meetings were held in Pembroke; March 8, June 13 and October 4. The Council, comprising community and stakeholder representatives (including observers from the Algonquins of Pikwàkanagàn and the Canadian Nuclear Safety Commission), is mandated to discuss issues of concern to the community and to look for solutions to address them in a timely and transparent manner. Next meeting is planned for 2008 January 31.

4.4 VIP Visits

There were a number of VIP tours of the Chalk River site, featuring stops at the waste management areas, NRU, the hot cells and the fuel laboratory during this period. Such visits included:

Pembroke Regional Hospital, 2007 April

- Several Executives toured the Dedicated Isotope Facilities

Natural Resources Canada, 2007 June;

- Nuclear Legacy Liabilities Program representatives toured the Waste Management Areas

University of Ottawa and University of Toronto, 2007 August;

- Environmental Science students conducted a three-day Environmental Field Study

Renfrew County Council, 2007 October; and

- More than 20 Council members toured the site, and then held a full County Council meeting at AECL's J.L. Gray building.

Annual Bring Our Kids to Work Day, 2007 November

- more than 70 grade nine students involved in the annual event; and

Federal Government and Business related visits occurred throughout the year.

4.5 Participation in Community Events

AECL either supported and/or participated in more than sixty (60) community events over the reporting period. This included a number of well-attended local fairs and festivals in Renfrew County, including but not limited to: the 150th Beachburg Fair, Options 2007 Skilled Trades Fair (Renfrew, 2007 April), Showcase 2007 (Petawawa, 2007 April). Participation at these events provided opportunities for members of the public to ask questions regarding the environmental and operational performance of AECL.

In addition:

- AECL will be participating in a number of Chamber of Commerce events including corporate sponsorship of the 4th Annual Upper Ottawa Valley Chamber of Commerce Awards Gala in 2008 January (AECL was recognized with the 2007 Passport to Prosperity Award for its trades-related education partnerships) and the Upper Ottawa Valley Chamber of Commerce (UOVCC) Annual Golf Tournament (2007 May);

- Corporate sponsorship was provided to the Petawawa Civic Centre Days in June 2007; and
- AECL representatives sit on a number of community Boards of Directors including the Deep River and District Family Health Team, the Deep River and District United Way, the Deep River and District Chamber of Commerce, the Upper Ottawa Valley Chamber of Commerce, and the United Way/Centraide of the Upper Ottawa Valley Inc.

4.6 Public Consultation Activities

Members of the Environmental Stewardship Council and elected officials are given regular project updates at scheduled meetings and as new information becomes available. As projects reach significant milestones, they are featured in the quarterly community newsletter, *Contact*, that is sent to 33,000 households and businesses in Renfrew and Pontiac Counties, and is also posted on AECL's external website. During the period, ESC, elected officials and public were updated on the Shielded Modular Above Ground Storage (SMAGS) Project; the Liquid Wastes Transfer and Storage (LWTS) Project; the Ottawa Riverbed Remediation (ORR); the Fuel Packaging and Storage Project (FPS); the Bulk Materials Landfill (BML); the Geological Waste Management Facility (GWMF); Waste Analysis Facility (WAF); the NRU Rod Bays; the decommissioning of the Pool Test Reactor; the demolition of old bus garages in Deep River; clean up work on a river embankment; construction of a new salt storage shed and the successful retrieval of glass blocks from a waste management area.

4.7 Disclosure Interactions

Chalk River's environmental performance index, regarding Dose from Radiological Air and Liquid Emissions is included in the quarterly, bilingual community newsletter, Contact. This publication is also available to the public via the external website at www.aecl.ca.

During this period, the following reports were issued to all community stakeholders at Chalk River and Whiteshell:

- AECL's Corporate Annual Report for 2005-2006 (also posted on the external website);
- "AECL Annual Environmental Performance Report for 2004", AECL-Misc-387-04, Revision 0, 2005 December;
- Provided council with Environmental Protection Index, a set of performance measures closely aligned with the strategic environmental objectives, January 2007; and
- The latest independent verification of our environmental monitoring program as conducted by Laval University, "Radiological Environmental Survey Outside the Chalk River Laboratories Site", February 2006.

Community stakeholders including elected officials and Emergency Management Ontario were advised of a number of unplanned events including:

- NRU extended outage in fall of 2007;
- Transportation of an employee to Deep River Hospital for a minor electrical shock from a portable heater (Emergency Management Ontario (EMO) was not notified in this case); and

- A traffic accident involving an AECL shipment, traveling from Tiverton, Ontario to the Chalk River Laboratories in February 2008.

No unresolved local community concerns were raised as a result of information provided.

4.8 Media Coverage

AECL's activities were tracked in the national, regional and local papers, radio and television. Environment-related articles included:

- The NRU outage and medical isotope crisis was of the greatest importance in 2007;
- Ongoing community support for new domestic nuclear build with an emphasis on the technology of choice being Canadian;
- The signing of a Memorandum of Agreement with Argentina for an expanded scope of nuclear cooperation;
- The drilling of boreholes in testing for the suitability of a Geological Waste Management Facility (GWMF) at CRL;
- Coverage of the invited presentation to the Canadian Nuclear Society by the General Manager of Decommissioning and Waste Management;
- An agreement between the Town of Deep River and AECL to potentially hook up to the Town's water supply (AECL would pay for the installation of a third processing unit and the necessary infrastructure to run the line to the CRL site);
- The agreement between AECL and the Renfrew County District School Board to lease the Keys School (saving construction costs and reducing environmental impacts);
- Results of provincial polling showing increased support for nuclear and CANDU technology;
- Updates on the Bruce retube project meeting major milestones with no impact on the environment;
- The announcement that the Pembroke Regional Hospital would be opening a nuclear medicine unit and recognizing that AECL would be supplying medical isotopes;
- Coverage of AECL being ahead of schedule on the construction of the Pt. Lepreau Solid Radioactive Waste Management Facility;
- Coverage of AECL's support for the Deep River Science Academy and the various environment-related projects; and
- The LLRWMO conducts an extensive Consultation & Communications program with Responsible Authorities (NRCan, CNSC, Fisheries & Oceans Canada), Federal, Provincial and Municipal officials, other stakeholders, and with the general public, especially in the Port Hope area. The LLRWMO participates in Trade Shows, Home Shows, Fall-Fairs and other local events within the area served by the Port Hope Area Initiative. A public walk-in information exchange office is also maintained in Port Hope. Regular summaries of the LLRWMO communications activities were provided to NRCan.

5. ACRONYMS AND TERMINOLOGY

ACR	Advanced **CAN**ada **D**euterium **U**ranium nuclear power reactor system (CANDU) Reactor
ADS	Active Drain System, intended to transfer radioactive liquids generated by CRL operations, to the Waste Treatment Centre (WTC) for decontamination, and is the preferred method of disposal of radioactive liquid waste that meet criteria for treatability.
AECL	Atomic Energy of Canada Limited
ALARA	The principle of maintaining emissions and radiation doses as low as reasonably achievable, social and economic factors being taken into account.
ALWTC	The Active Liquid Waste Treatment Centre at the Whiteshell Laboratories, which concentrates and solidifies medium level radioactive wastewater, and collects low level wastewater for controlled discharge.
ANR	Audit Non-Conformance Report
BML	Bulk Material Landfill
BOD	Biological Oxygen Demand
BTU	British Thermal Unit is a unit of energy used in the power, steam generation, and heating.
CAC	Criteria Air Contaminants consist of Carbon Monoxide (CO), oxides of sulphur and nitrogen (Sox and Nox), Total Particulate Matter (TPM), Particulate Matter below 10 microns (PM10), Particulate Matter below 2.5 microns (PM2.5), and Volatile Organic Compounds (VOCs).
CANDU	**CAN**ada **D**euterium **U**ranium nuclear power reactor system; registered trademark.
CEAA	Canadian Environmental Assessment Act
CEPA	Canadian Environmental Protection Act, regulated by Environment Canada
CEO	A Chief Executive Officer
CFC	Chlorofluorocarbons, used primarily as the working fluid in refrigeration and air conditioning systems, and harmful to the earth's ozone layer.
CCME	Canadian Council of Ministers of the Environment
CNSC	Canadian Nuclear Safety Commission, the federal body responsible for regulating the Canadian nuclear industry in accordance with the Nuclear Safety & Control Act and associated regulations. This was formerly the Atomic Energy Control Board (AECB).

CPTC	NRU installed a Cold Pressure Tube Cooling (CPTC) system, which recirculates light-water system, providing pressure cooling. Once-through cooling of the in-reactor pressure tubes by process water is no longer permitted.The experimental fuel testing program remains suspended pending loops upgrades and the required upgrades cannot be started until CPTC frees up the loops.
CRL	AECL's Chalk River Laboratories research site, located beside the Ottawa River at Chalk River, Ontario.
DIF	Dedicated Isotope Facilities, located at CRL, includes the MAPLE 1 Reactor, the MAPLE 2 Reactor and the New Processing Facility. These facilities, currently being commissioned, will be a key component of AECL's isotope services business.
DP	AECL's partially decommissioned Douglas Point nuclear generating station, located near Tiverton, Ontario.
DRL	Derived Release Limit for normal emissions of radioactive material in airborne or liquid effluents from nuclear facilities derived from the regulatory radiation dose limits for members of the public considering all significant environmental exposure pathways.
EA	Environmental Aspect
EAA	Environmental Aspect Assessments
EER	Ecological Effects Review conducted at the CRL site of all waste streams based upon available risk assessment guidelines.
EMS	Environmental Management System
EMO	Emergency Management Ontario
EnvP	Environmental Protection Program
EnvPCI	A measure related to the strategic objective to demonstrate regulatory compliance. The measure is based upon feedback form the regulators, effectiveness in responding to regulator driven actions and any identified gaps with regulations or regulatory expectations.
Env PI	A measure of environmental performance related to the strategic objective to prevent environmental degradation (i.e. including pollution prevention). The measure is based upon setting 2015 targets for each of the environmental aspect groups identified for CRL.
EnvPMI	A measure related to the strategic objective to provide an effective environmental management system. The measure is based upon the ISO-14001 environmental management standard.
EnvPPI	A trended measure of strategic environmental objectives, derived from the data collected and displayed in the EnvPPI's four sub-indices; EnvPSTI, EnvPMI, EnvPI and EnvPCI

EnvPSTI	A measure related to the strategic objective to provide continual improvement of systems and technology that help ensure AECL controls its environmental aspects and the prevention of pollution.
EPA	Environmental Protection Agency (EPA or sometimes USEPA) is an agency of the federal government of the United States charged with protecting human health and with safeguarding the natural environment: air, water, and land
ESC	Environmental Stewardship Council
FEAI	Federal Environmental Assessment Index
FEAC	Federal Environmental Assessment Coordinator
FPRC	Federal-Provincial Review Committee
FPS	Fuel Packaging and Storage Projects
G-1	AECL's partially decommissioned Gentilly-1 nuclear generating station, located at Bécancour, Québec.
GWP	Global warming potential: a relative measure per unit mass of the potential for substances released into the atmosphere to contribute to global warming, based on carbon dioxide having a GWP = 1.0.
GWMF	Geological Waste Management Facility
Halons	Brominated chlorofluorocarbons, used primarily as fire suppressants, and which are relatively more harmful to the earth's ozone layer than CFCs.
HCFC	Hydrochlorofluorocarbons, used primarily as a working fluid for refrigeration and air conditioning systems, but which are less harmful to the earth's ozone layer than CFCs.
HDD	Heating Degree Days is used in the normalization of data (Acid Gas Emissions)
HFC	Hydrofluorocarbons, are composed entirely of carbon, hydrogen, and fluorine. They have no known effects at all on the ozone layer, but do cause global warming
HWUP	Heavy Water Upgrading Plant
IFTF	Immobilized Fuel Test Facility, located at Whiteshell Laboratories (WL)
ISO	International Organization for Standardization
LLLW	Low Level Liquid Waste
LLRW	Low Level Radioactive Waste
LLRWMO	AECL's Low-Level Radioactive Waste Management Office, established in 1982 to carry out designated responsibilities of the federal government for historic low-level radioactive wastes in Canada.
LMU	Liquid Management Unit

LWE	Liquid Waste Evaporator, treatment component with the Waste Treatment Centre used in the reduction of Liquid waste.
LWR	Light Water Reactor
LWTS	Liquid Waste Transfer and Storage
MAGS	Modular Above Ground Storage facility for low-level radioactive waste.
MAPLE	Multipurpose Applied Physics Lattice Experiment
MISA	Ontario Ministry of the Environment's Municipal Industrial Strategy for Abatement; supplies information on the potential non-radiological environmental impacts of CRL's operations to the Ottawa River and the local environment.
MOE	Ministry of the Environment
MOX	Mixed Oxide Fuel
MPF	Molybdenum-99 Production Facility
NF	Nuclear Facilities
NFWMP	Nuclear Fuel Waste Management Program
NLBU	Nuclear Laboratories Business Unit
NLLP	Nuclear Legacy Liabilities Program focus on safely addressing nuclear facility liabilities on AECL sites and managing the associated wastes. The facilities include those from the early years of Canada's nuclear program, prior to the creation of AECL in 1952.
NPD	AECL's partially decommissioned Nuclear Power Demonstration nuclear generating station, located at Rolphton, Ontario.
NPF	New Processing Facility
NPRI	National Pollutants Release Inventory (NPRI) program, determines the Criteria Air Contaminants (CACs) arising from the burning of fuels are to be reported to Environment Canada, provided the emissions exceed specific threshold limits.
NOx	Nitrogen Oxides
NRCan	Natural Resources Canada
NRU	The 125-megawatt, heavy water cooled and moderated National Research Universal nuclear research reactor located at the CRL site. NRU is currently used for both nuclear research and development, and for production of medical radioisotopes.
NRX	National Research Experiment reactor, currently in decommissioning stage
NSCA	Canadian Nuclear Safety and Control Act are the principal regulatory requirements applicable to the generation and management of radioactive wastes

OC	Operational Controls is any form of control that manages the environmental impact of an environmental aspect (for example, procedures, safety systems, maintenance, monitoring)
ODP	Ozone depleting potential: a relative measure of the potential for ODS's to cause damage to the earth's ozone layer, based on CFC-11 having an ODP = 1.0.
ODS	Ozone depleting substance: refers to halogenated hydrocarbons (CFCs, HCFCs, Halons, etc.) that are harmful to the earth's ozone when released to the atmosphere. In response to international agreements, federal and provincial policies and regulations call for control and phase-out of designated ODS's from manufacture and use.
OFI	Opportunities for Improvement (OFIs) were identified and categorized as system weaknesses within CRL and AECL.
ORR	Ottawa Riverbed Remediation
PCB	Poly-chlorinated biphenyls, used primarily as insulating fluids in electrical equipment. PCBs are environmentally persistent and bioaccumulative substances considered to be environmentally harmful.
PHAI	Port Hope Area Initiative is a Low-Level Long-Term Radioactive Waste Management Project, established to clean up various sites contaminated with historic low-level radioactive waste and to construct and operate facilities for the long-term management of the wastes
PLC	Public Liaison Committee includes representatives of the key stakeholder of AECL; local elected officials, provincial government representatives, site tenants and the Sagkeeng First Nation, in accordance with established Terms of Reference.
QA	Quality Assurance
QMI	Quality Management Institute
RFFL	Recycle Fuel Fabrication Laboratories
SEA	Significant Environmental Aspect (SEA) is one that AECL considers important enough to ensure that it is being managed adequately to prevent potential environmental impacts, ensuring legal compliance requirements that AECL is subject to, and/or conform to other requirements that AECL voluntarily accepts.
SMAGS	Shielded Modular Above Ground Storage facility for radioactive waste.
SP	AECL's Sheridan Park site consisting of engineering offices and a laboratory, located in Mississauga, Ontario.
SOx	Sulphur Oxides

SRC	AECL Safety Review Committee, responsible for independent review to assure the AECL President that proposed and existing AECL facilities and activities are acceptable with respect to health, safety and protection of the environment, as defined in AECL Policy 40101.
STP	Sewage Treatment Plant
SWS	Storage-With-Surveillance, includes legacy waste areas and facilities and buildings that have been shut down and formally turned over to Decommissioning.
TAC	Transportation Association of Canada
TDS	Total Dissolved Solids, a measure of the solids dissolved in the water. It is determined by filtering and weighing a portion of the sample.
TPM (PM)	Total Particulate Mater or Particulate Mater (PM) is one of several non-radioactive airborne emissions from stationary sources at AECL sites. They are derived from combustion products that result from the burning of fuel oil to produce steam and hot water for heating and process.
TSS	Total Suspended Solids, a measure of the solids in the water. It is determined by filtering and weighing a portion of the sample.
UOVCC	Upper Ottawa Valley Chamber of Commerce
URL	AECL's Underground Research Laboratory, located near WL, which conducts research in support of the concept of deep geological disposal of high level nuclear wastes.
VOC	Volatile Organic Compounds are one of several non-radioactive airborne emissions from stationary sources at AECL sites. They are derived from combustion products that result from the burning of fuel oil to produce steam and hot water for heating and process.
WAF	Waste Analysis Facility
WL	AECL's Whiteshell Laboratories research site, located beside the Winnipeg River near Pinawa, Manitoba.
WMA	Waste Management Area containing facilities for storage of radioactive wastes. Licenced WMAs are maintained at both the CRL and WL sites.
WSS	Waste Storage System
WTC	The Waste Treatment Centre, located at the CRL site, which uses a large evaporator to remove contaminants from low-level radioactive wastewater for solidification.

Appendix A

Environmental Protection Program Indices

Environmental Program Index (EnvPPI) - December
Chalk River Laboratories

EnvPPI = 0.4 x EnvPI + 0.1 EnvPMI + 0.1 EnvPCI + 0.4 EnvPSTI

Performance Areas & Parameters		Wt	2006	2007/08 YTD	Yearly Target
Environmental Protection Program Index (EnvPPI)		**100%**	**63%**	**72%**	**72%**
Environmental Protection Index (EnvPI)		**100%**	**56%**	**60%**	**58%**
EnvPI1	Emissions (Rad & Non-rad)	64%	38%	41%	41%
EnvPI2	Waste Recycling	5%	49%	91%	51%
EnvPI3	Incidents (excl. negligable)	25%	100%	100%	100%
EnvPI4	Road Salt Use	2%	100%	100%	80%
EnvPI5	Energy Use	2%	69%	69%	66%
EnvPI6	Petroleum Storage Tanks Conformance	2%	50%	60%	60%
Environmental Protection Management Index (EnvPMI)		**100%**	**95%**	**100%**	**90%**
EnvPMI 1	EMS Audit Nonconformities (Program)	50%	90%	100%	80%
EnvPMI 2	EMS Audit Nonconformities (Program Implementation)	50%	100%	100%	100%
Environmental Protection (Regulatory) Compliance Index (EnvPCI)		**100%**	**85%**	**93%**	**88%**
EnvPCI 1	Regulatory Commitment Management (Program)	50%	100%	100%	88%
EnvPCI 2	Reguatory Commitment Management (Program Implementation)	50%	70%	85%	88%
Environmental Protection Systems and Technology Index (EnvPSTI)		**100%**	**57%**	**73%**	**78%**
EnvPSTI 1	% Project Milestones in Env Plan On Schedule (Appendix C)	70%	57%	[redacted]	85%
EnvPSTI 2	% Project Milestones in Env Plan On Schedule (Appendix D)	30%	57%	67%	60%

Environmental Program Index (EnvPPI) - December
Whiteshell Laboratories

EnvPPI = 0.4 x EnvPI + 0.1 EnvPMI + 0.1 EnvPCI + 0.4 EnvPSTI

Performance Areas & Parameters		Wt	2006	2007/08 YTD	Yearly Target
Environmental Protection Program Index (EnvPPI)		**100%**	77%	82%	73%
Environmental Protection Index (EnvPI)		**100%**	**86%**	**82%**	**76%**
EnvPI1	Emissions (Rad & Non-rad)	64%	82%	77%	67%
EnvPI2	Waste Recycling	5%	60%	69%	60%
EnvPI3	Incidents (excl. negligible)	25%	100%	98%	100%
EnvPI4	Road Salt Use	2%	96%	96%	76%
EnvPI5	Energy Use	2%	54%	[redacted]	55%
EnvPI6	Petroleum Storage Tanks Conformance	2%	100%	100%	100%
Environmental Protection Management Index (EnvPMI)		**100%**	**100%**	[redacted]	**100%**
EnvPMI 1	EMS Audit Nonconformities (Program)	50%	100%	[redacted]	100%
EnvPMI 2	EMS Audit Nonconformities (Program Implementation)	50%	100%	100%	100%
Environmental Protection (Regulatory) Compliance Index (EnvPCI)		**100%**	**100%**	**100%**	**88%**
EnvPCI 1	Regulatory Commitment Management (Program)	50%	100%	100%	88%
EnvPCI 2	Reguatory Commitment Management (Program Implementation)	50%	100%	100%	88%
Environmental Protection Systems and Technology Index (EnvPSTI)		**100%**	**57%**	**77%**	**60%**
EnvPSTI 1	% Project Milestones in Env Plan On Schedule (Priority 2 & 3)	100%	57%	77%	60%

Appendix A

Environmental Protection Program Indices

Environmental Program Index (EnvPPI) - December
Chalk River Laboratories

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EnvPSTI 1 % Project Milestones in Env Plan On Schedule (Appendix C)	70%	57%	[illegible]	85%
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Environmental Program Index (EnvPPI) - December
Whiteshell Laboratories

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